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**PATENT APPLICATION**

**TAG NUCLEIC ACIDS AND PROBE ARRAYS**

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## **TAG NUCLEIC ACIDS AND PROBE ARRAYS**

### **PRIORITY CLAIM**

This application claims priority of U.S. Provisional Application 60/195,585 filed April 6, 2000 entitled "Tag Nucleic Acids and Probe Arrays", which is incorporated herein by reference for all purposes in its entirety.

### **FIELD OF THE INVENTION**

This invention provides sets of nucleic acid tags, arrays of oligonucleotide probes, nucleic acid-tagged sets of recombinant cells and other compositions. The invention relates to the selection and interaction of nucleic acids, and nucleic acids immobilized to solid substrates, including related chemistry, biology, and medical diagnostic uses.

### **BACKGROUND OF THE INVENTION**

The use of short nucleic acid sequences as "tags" to identify specific biological substances in a sample is known. For example, tags may be used as a method of or as labels for a wide variety of biological and nonbiological materials, see, for example, Dollinger, *The Polymerase Chain Reaction* pp. 265-274 Mullis et al., editors (Birkhauser, Boston, 1994) or as a method of screening complex chemical libraries. See, for example, Alper, *Science*, 264: 1399-1401 (1994); and Needels et al. *PNAS* 90, 10700-10704 (1993). See also US Patent Nos. 4,359,353, 4,441,943, 5,451,505 and 5,654,413.

There is great necessity for sets of tag sequences which are known to hybridize effectively to their complementary probe sequences with minimal cross-hybridization between the different tag sequences. The presently claimed invention provides sets of tag sequences, tag sequence kits, and methods of using tag sequences which fulfill these requirements.

## SUMMARY OF THE INVENTION

The presently claimed invention provides 2050 unique sequences which have been specifically chosen according to strict criteria to produce sequences suitable for a wide variety of “tagging” applications. These sequences are provided as SEQ ID NOS 1-2050.

In one embodiment, some or all of SEQ ID Nos 1-2050 comprise tag sequences. In a further embodiment, some or all of SEQ ID Nos 1-2050 comprise tag-probe sequences. In a further embodiment, the tag-probe sequences are immobilized to a solid support.

The unique sequences of the presently claimed invention may be used alone or in combinations of 10 or more, 100 or more, 200 or more, 500 or more, 1000 or more, 1500 or more, or 2000 or more as nucleic acid tags and/or tag-probes.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a plot of the discrimination score and the signal intensity for 2200 candidate sequences.

FIG. 2 shows an example of the sequences attached to each of the four array features representing a given tag sequence. Four features, organized vertically on the probe array, represent each tag-probe.

FIG. 3 shows the array features from an array designed to probe for the tag sequences of the presently claimed invention. For each of the four tag-probes shown, arranged horizontally across the array, the brightest hybridization signal is seen with the “PM” feature.

FIG. 4 is a scanned image of the hybridization patterns resulting from the hybridization of 2050 different probes containing regions complementary to the SEQ ID Nos 1-2050 to an array comprised of tag-probes corresponding to SEQ ID Nos 1-2050.

FIG. 5 is a scanned image of the hybridization patterns resulting from the hybridization of 50 different probes containing regions complementary to SEQ ID Nos 2001-2050 to an array identical to the array depicted in FIG. 4.

FIG. 6 shows signal intensities from two different independent experiments in which 2000 biotinylated oligonucleotide tags or 50 fluorescein labeled control oligonucleotides were hybridized to arrays designed as described above.

FIG. 7 shows the PM/MM ratios from the data described in FIG. 4 above.

## **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

### **I. Definitions**

As used herein, certain terms may have the following defined meanings.

As used in the specification and claims, the singular forms "a", "an" and "the" include plural references unless the context clearly dictates otherwise. For example, the term "an array" may include a plurality of arrays unless the context clearly dictates otherwise.

An "array" represents an intentionally created collection of molecules which can be prepared either synthetically or biosynthetically. In particular, the term "array" herein means an intentionally created collection of polynucleotides attached to at least a first surface of at least one solid support wherein the identity of each polynucleotide at a given predefined region is known. The terms "array," "biological chip" and "chip" are used interchangeably.

The array of molecules can be screened for biological activity in a variety of different formats (*e.g.*, libraries of soluble molecules, libraries of compounds tethered to resin beads, fibers, silica chips, or other solid supports). The fabrication of polynucleotide arrays on a solid substrate, and methods of use of the arrays in different assays, are described in US Patent Numbers: 5,143,854, 5,242,979, 5,252,743, 5,324,663, 5,384,261, 5,405,783, 5,412,087, 5,424,186, 5,445,934, 5,451,683, 5,482,867, 5,489,678, 5,491,074, 5,510,270, 5,527,681, 5,550,215, 5,571,639, 5,593,839, 5,599,695, 5,624,711, 5,631,734, 5,677,195, 5,744,101, 5,744,305, 5,744,992, 5,753,788, 5,770,456, 5,831,070, 5,856,011, 6,040,138 and 6,040,193 all of which are incorporated by reference herein in their entireties for all purposes. See also, US Serial Nos. 09/079,324, 09/122,216, and PCT Application WO US99/00730 each of which is incorporated by reference herein in its entirety for all purposes. Preferred arrays contemplated by the presently claimed invention have the probe densities as described in the above referenced patents. For example, the '305 patent discloses 100, 400, 1,000 and 10,000 probes/cm<sup>2</sup>.

"Solid support," "support," and "substrate" refer to a material or group of materials having a rigid or semi-rigid surface or surfaces. In many embodiments, at least one surface of the solid support will be substantially flat, although in some embodiments it may be desirable to physically separate synthesis regions for different compounds with, for example, wells, raised regions, pins, etched trenches, or the like. According to other embodiments, the solid support(s) will take the form of beads, resins, gels, microspheres, fibers or other geometric configurations.

A "discrete, known location" refers to a localized area on a solid support which is, was, or is intended to be used for placement or fabrication of a selected molecule and is otherwise referred to herein in the alternative as a "selected" region. The discrete, known location may have any convenient shape, *e.g.*, circular, rectangular, elliptical, wedge-shaped, etc. For the sake of brevity herein, "discrete, known locations" are sometimes referred to as "predefined regions," "regions," or "features." In some embodiments, a discrete, known location and, therefore, the area upon which each distinct compound is synthesized is smaller than about 1 cm<sup>2</sup> or even less than 1 mm<sup>2</sup>. In additional embodiments, a discrete, known location can be achieved by physically separating the regions (*i.e.*, beads, fibers, resins, gels, etc.) into wells, trays, etc.

As used herein, a "polynucleotide" is a sequence of two or more nucleotides. Polynucleotides of the present invention include sequences of deoxyribonucleic acid (DNA) or ribonucleic acid (RNA) which may be isolated from natural sources, recombinantly produced, or artificially synthesized. A further example of a polynucleotide of the present invention may be polyamide polynucleotide or peptide nucleic acid (PNA). This invention also encompasses situations in which there is nontraditional base pairing such as Hoogsteen base pairing which has been identified in certain tRNA molecules and postulated to exist in a triple helix. "Polynucleotide" is used interchangeably with "oligonucleotide" in this application.

The terms "nucleotide" and "nucleic acid base" include deoxynucleotides and analogs thereof. These analogs are those molecules having some structural features in common with a naturally occurring nucleotide such that when incorporated into a polynucleotide sequence, they allow hybridization with a complementary polynucleotide in solution. Typically, these analogs may have one or more modified bases, as well as modified forms of ribose and phosphodiester moieties. The changes can be tailor made to stabilize or destabilize hybrid formation, enhance

the specificity of hybridization with a complementary polynucleotide sequence as desired, or enhance stability of the polynucleotide.

The terms "nucleic acid," "nucleic acid molecule," or "nucleic acid sequence," refer to a deoxyribonucleotide or ribonucleotide polymer in either single- or double-stranded form, and unless otherwise limited, would encompass analogs of natural nucleotides that can function in a similar manner as naturally occurring nucleotides. Nucleic acids may be derived from a variety of sources including, but not limited to, naturally occurring nucleic acids, clones, synthesis in solution or solid phase synthesis.

As used herein a "probe" is defined as a nucleic acid capable of binding to a target nucleic acid of complementary sequence through one or more types of chemical bonds, usually through complementary base pairing, usually through hydrogen bond formation. As used herein, a probe may include natural (*i.e.* A, G, U, C, or T) or modified bases (7-deazaguanosine, inosine, *etc.*). In addition, the bases in probes may be joined by a linkage other than a phosphodiester bond, so long as it does not interfere with hybridization. Thus, probes may be peptide nucleic acids in which the constituent bases are joined by peptide bonds rather than phosphodiester linkages.

The term "target nucleic acid" or "target sequence" refers to a nucleic acid or nucleic acid sequence which is to be analyzed. A target can be a nucleic acid to which a probe will hybridize. The probe may or may not be specifically designed to hybridize to the target. It is either the presence or absence of the target nucleic acid that is to be detected, or the amount of the target nucleic acid that is to be quantified. The term target nucleic acid may refer to the specific subsequence of a larger nucleic acid to which the probe is directed or to the overall sequence (*e.g.*, gene or mRNA) whose expression level it is desired to detect. The difference in usage will be apparent from context.

The term "hybridization" refers to the process in which two single-stranded polynucleotides bind non-covalently to form a stable double-stranded polynucleotide; triple-stranded hybridization is also theoretically possible. The resulting (usually) double-stranded polynucleotide is a "hybrid." The proportion of the population of polynucleotides that forms stable hybrids is referred to herein as the "degree of hybridization." Hybrids can contain two DNA strands, two RNA strands, or one DNA and one RNA strand.

Methods for conducting polynucleotide hybridization assays have been well developed in the art. Hybridization assay procedures and conditions will vary depending on the application and are selected in accordance with the general binding methods known including those referred to in: Molecular Cloning, A Laboratory Manual, Second Ed., J. Sambrook et al., Eds., Cold Spring Harbor Laboratory Press, 1989 ("Sambrook et al."); Berger and Kimmel, "Methods in Enzymology," Vol. 152, "Guide to Molecular Cloning Techniques", Academic Press, Inc., San Diego, CA., 1987; Young and Davis, *Proc. Natl. Acad. Sci., U.S.A.*, 80:1194 (1983), each of which are incorporated herein by reference.

It is appreciated that the ability of two single stranded polynucleotides to hybridize will depend upon factors such as their degree of complementarity as well as the stringency of the hybridization reaction conditions.

As used herein, "stringency" refers to the conditions of a hybridization reaction that influence the degree to which polynucleotides hybridize. Stringent conditions can be selected that allow polynucleotide duplexes to be distinguished based on their degree of mismatch. High stringency is correlated with a lower probability for the formation of a duplex containing mismatched bases. Thus, the higher the stringency, the greater the probability that two single-stranded polynucleotides, capable of forming a mismatched duplex, will remain single-stranded. Conversely, at lower stringency, the probability of formation of a mismatched duplex is increased.

A nucleic acid "tag" is a selected nucleic acid with a specified nucleic acid sequence. A nucleic acid "probe" hybridizes to a nucleic acid "tag."

A nucleic acid "tag-probe" is a specific sequence capable of hybridizing to a specific "tag." Typically, the "tag-probe" is the complement or a partial complement of the "tag." In one typical configuration, nucleic acid tags are incorporated as labels into biological libraries, and the tag nucleic acids are detected using a microarray.

Throughout this disclosure, various aspects of this invention are presented in a range format. It should be understood that the description in range format is merely for convenience and brevity and should not be construed as an inflexible limitation on the scope of the invention.

Accordingly, the description of a range should be considered to have specifically disclosed all the possible sub-ranges as well as individual numerical values within that range. For example, the description of a range such as 4 to 50 should be considered to have specifically disclosed all integers within the sub-ranges such as 4 to 10, 4 to 20, 4 to 30, 4 to 40, 4 to 50, 5 to 10, 5 to 20 etc., as well as individual numbers within that range, for example, 6, 8, 15, 20, 32, 39, 43, 48 etc. This applies regardless of the breadth of the range. Likewise, a description of a range such as 1 or more, 10 or more,  $10^3$  or more,  $10^6$  or more, or  $10^{12}$  or more should be considered to have specifically disclosed individual numbers within that range as well as higher numbers, for example, 20,  $2 \times 10^4$ ,  $3 \times 10^8$ ,  $4 \times 10^{15}$ ,  $5 \times 10^{18}$ , etc.

Various patents, patent applications and publications are referenced throughout the specification, unless otherwise indicated, each is incorporated by reference in its entirety for all purposes.

## II. General

The presently claimed invention provides 2050 unique sequences which have been specifically chosen according to strict criteria to produce sequences suitable for a wide variety of “tagging” applications. These sequences are provided as SEQ ID NOS 1-2050.

In one embodiment, some or all of SEQ ID Nos 1-2050 comprise tag sequences. In a further embodiment, some or all of SEQ ID Nos 1-2050 comprise tag-probe sequences. In a further embodiment, the tag-probe sequences are immobilized to a solid support.

An initial set of 2200 20mer sequences was selected with closely matched melting temperatures. A further filter based on rules such as those described in US Provisional Patent Application 60/176,520 was applied to optimized and standardize the hybridization characteristics of the set. Finally, sequences were removed if they were identical or nearly identical to each other or to sequences in the public databases. This reduced the pool of candidate sequences to 2200. The hybridization performance of the entire set of 2200 candidate sequences was evaluated. Labeled oligonucleotides complementary to the candidate sequences were synthesized and hybridized to an array containing probes designed to analyze the performance of all 2200 candidate sequences. The array contained four different sequences to

interrogate each candidate sequence. A probe designed to be the perfect match complement to the candidate sequence (PM), a probe designed to have a central mismatch at position 10 (MM), and probes designed to be the complements to the PM and MM probes (cPM and cMM respectively).

FIG. 1 shows a plot of the discrimination score and the signal intensity for all 2200 sequences. A line was fitted to select the 2050 sequences with the highest discrimination and signal intensity. These 2050 sequences are SEQ ID Nos. 1-2050.

In one embodiment of the invention, the sequences of the presently claimed invention are tag-probes attached to a solid support. Methods of immobilizing presynthesized sequences and synthesizing sequences de novo on solid supports are known. See for example, US Patent Numbers: 5,143,854, 5,242,979, 5,252,743, 5,324,663, 5,384, 261, 5,405,783, 5,412,087, 5,424,186, 5,445,934, 5,451,683, 5,482,867, 5,489,678, 5,491,074, 5,510,270, 5,527,681, 5,550,215, 5,571,639, 5,593,839, 5,599,695, 5,624,711, 5,631,734, 5,677,195, 5,744,101, 5,744,305, 5,753,788, 5,770,456, 5,831,070, 5,856,011, 5,744,992, 6,040,138, 6,040,193, US Serial Nos. 09/079,324, 09/122,216, and PCT Application WO US99/00730.

In this and other embodiments it is often useful to provide control probes. As one example, SEQ ID Nos. 1-2000 may comprise the tag-probes and SEQ ID Nos. 2001-2050 may comprise the control probes. In a preferred embodiment, the control probes are representative of the population with respect to observed signal intensities and discrimination. In a further preferred embodiment, tag sequences with relatively low signals may be over-represented in the control sequences so as to increase information about the sensitivity of experiments at the lower limit of detection.

## METHODS OF USE

The use of short nucleic acid sequences as “tags” to identify specific biological substances in a sample is known. For example, tags may be used as a method of or as labels for a wide variety of biological and nonbiological materials, see, for example, Dollinger, The Polymerase Chain Reaction pp. 265-274 Mullis et al., editors (Birkhauser, Boston, 1994) or as a method of screening complex chemical libraries. See, for example, Brenner and Lerner, PNAS

89, 5281-5383 (1992); Alper, *Science*, 264: 1399-1401 (1994); and Needels et al. *PNAS* 90, 10700-10704 (1993). See also US Patent Nos. 4,359,353, 4,441,943, 5,451,505 5,149,625, 5,654,413 and 5,800,992.

In addition to those applications above, the presently claimed sequences are suitable to be employed for any of the methods described in US Patent Application No. 08/626,285 (filed 4/4/96), including as a method of analysis of genomic DNA. For example, as described in the '285 application, tag arrays may be used to identify the function of identified open reading frames (ORFs) by creating deletion mutants for each ORF and analyzing the resulting deletion mutants under a wide variety of selective conditions.

US Provisional Patent Application No. 60/140,359 (filed 6/23/99) described methods of using tag arrays and the single base extension reaction for genotyping and other types of biological analysis. A set of tags and a tag array derived from Seq. ID Nos. 1-2000 and their complements are suitable to be used for the methods described in this application. Briefly, the '359 application describes methods of determining the genotype of an individual at a polymorphic locus or the frequency of alleles in a population. One embodiment of the method involves three step: (1) amplification of the polymorphic locus, (2) primer extension of a sequence-tagged primer with distinct labels for different polynucleotides at the polymorphic locus, and (3) hybridization to a tag array. The amount of each distinct label can be determined at known positions of the tag array. Each tag represents a distinct polymorphic locus and each distinct label represents a distinct allelic form at the polymorphic locus. The method permits the simultaneous determination of a genotype at multiple loci, as well as the determination of allele frequencies in a population. Another embodiment employs just steps (2) and (3).

Table 1, below, lists the sequences of the presently claimed invention. Column 1 lists the sequence ID number corresponding to each sequence. Column 2 lists the sequences in the 3' to 5' direction.

**TABLE I**

Seq. Id	3' to 5' sequence
1	TAAACTAGCATTGAGCCCAC
2	AAATCAGCAAACGGGCTCCG
3	GAATTGATAATCGCAGCCAC
4	GATATAGGAATGGCGCATAC

Seq. Id	3' to 5' sequence
5	CTCATCGGAAGGGCTCGTAA
6	ACAGATGGAAAGGCAGTTCT
7	TTGGTAGCTGAGTGCCCTA
8	TAACTGGTTGACGCCACGC
9	TAATTGAGCTGACGGCGCAC
10	TTGTTGCTACTCTGGCCCGA
11	TTCCGTGCATAGTATAAGGGA
12	TTATGCGACTTATCTCGGGA
13	TGTATAGGATTATGTCCGCG
14	CTGCTAGGAATATGAGCTAC
15	CTTCTGTCAATATGGGTACG
16	TATTCGAGATATGAGGCGC
17	TTGATCGTAGATTCTGTGAGC
18	CGAGATTACAATTACCGAGC
19	TGGTGTCTAGCTTCCAGCCT
20	TGAGGTACCGGTTATGCTA
21	TGGTTACTGGTATATGCCGC
22	CCGAGTGCAGAATAAACCG
23	GCAGGTCTCAATACAAACTCA
24	GAAGCTACCATACGCCAGCA
25	ACGGGATAACAACGCCAGCCT
26	AGAAGATCAACAGCTCGTCC
27	ATAAGATCAAGACCTGTGCC
28	ATTAGATTAAGACCAGCGCC
29	ATATAATCAAGACTGGCGCG
30	AGCATATAACCACGTATCCG
31	ACACTATTAAAGCTGCTCCG
32	CAATGTATAAGACTCTCGCC
33	CACTAATTCAAGACGAAGCCG
34	GACCCTATCAGACAGATGCA
35	CACGCATCAAGACAGTATCG
36	CAGCTCTTAAGACTTGGACA
37	GGTATCATAGGACATTGCA
38	GGTTACATGGATATAGCACC
39	TGTGTTCAGCTATGCAGGC
40	TAATTGCTGCAACCAGATC
41	ATAATTCCAACATGGGAGCC
42	CATTGCTTAATATGGGAGCC
43	CAATGCTTAATACCGACACG
44	GATTGCTTAGACCTGACCG
45	GATTCAATTAGACCAGGCCT
46	GATTCTACATGCCACTAGCA
47	CCTGCGAACTGGCCTGAATA
48	CGCAGCGGAAGGCTCAATAA
49	CCTACCGCAAGGCAGGATAA
50	CCTATGATAAGGCACGCACA
51	CGCTGTGCAAGGCTCGTATA
52	CGATTGTCAAGGCAGTGATA

Seq. Id	3' to 5' sequence
53	CATTGCGAACTGCATCTAAC
54	GATAGTCCAATGCTACTGAC
55	GATTGGTAATGCGCTGTAA
56	GACGTTCAATGCAGCGTAA
57	GAGAGTCAATGCCGACTAA
58	GAGATCCGAATGCGCGTACT
59	CGAGATCCAAGGCCATGAT
60	AGCTTGACAGTAACCATGA
61	AGAGTTGAACAGCATACCT
62	TATCTGATCGGACGGCCAGT
63	TATTGACTACTGCGCCTCAG
64	TTGGACTATTGGGTATGCC
65	TTGTCAGATTGGATGCGCTC
66	TATGCAGAATGGCGTGTATC
67	CATTGGATAAGCACTGATCG
68	CCCGGAATAAGGCCACGATA
69	CTCATAGAACGGACCAGATC
70	CATAGATTAAGCACTCAGCC
71	CATGATGTAAGCACGCTACC
72	CAGGAGCGAACGAGATACTC
73	CAGAGCAGAACGACTCACGT
74	TACATAGGCTTCAGCATCAC
75	TATTATACCTTGATCCGCGC
76	TAAACTGCTTGCATAACGGCG
77	TATAAGCCTTGCAGCGGACC
78	TTTAAGCGGTGGATCTAGCT
79	TTAATAGCCTTGAGCAGCGA
80	ATAAAATGCTTGAACCTCG
81	GAAAGTTCATGGAATCGAGC
82	GCAAGGATTTCGACTCAGAC
83	CAAAGAATAATCGCTCTCG
84	TAAAGCACTTATGACTCGGC
85	TTATAGCATTCTGTAGGC
86	TCGCTGACATTGATTAGCC
87	CCTTGAATAATATCTCGGCC
88	AGGTCCAGAAATTGCTGCAC
89	AGCTCAGGAAATTCTAGCGA
90	AGCTATGCAAATTAGAGGCC
91	GGTAGGCTAATTATGGCAC
92	CTAATGCAATTCAATGCCGC
93	CAACTGGCAATCAATACGCT
94	CCAAGCGAATGCAACGTATC
95	GCATAGCGAATTGGAGATAC
96	GCATGTCGAATGGATGATAC
97	GCACGTTCAATGGCTCGACT
98	GCAGCGCAATCTGTCGAGTA
99	AGCAGTGCAAATCCTGATAC
100	AGCTTCGCAAATCTGGTACA

Seq. Id	3' to 5' sequence
101	AGCCTGCGAAATCTACTGAA
102	GCAGATCGAATTATGGAGAC
103	GCAGAGTCATTATCATGCC
104	CGTTAGGCAATACATTTCCC
105	ACTGGTGCAAAGTCTTCGAC
106	GGTATATGAATGTGTCGTCC
107	GATAGTCAATCTAGGTGAC
108	GCAGTGCAATGGATGTACTA
109	GCTAGGCTAATGTCCGGCTA
110	GGTAGCCTAATGTGTCGTCA
111	GGACGTGCAATCTTGTGACC
112	GAGCGCCGAATCTAGTCGAA
113	GGGAGCGACCTCTAGCTTAT
114	GCGGGTCGAATCTCGCTTAA
115	CGCCGCGCAAGCTGTATTAA
116	CGGCTGCGAAGCTGTCTTAA
117	CATCCGCTAAGATCGGTTAA
118	CGTGCAGCATAATCCATCAG
119	TGAGAGCTGGATCGCATTCC
120	TAGGTGCTAGGATCTCAGCC
121	TAGGTATCAGGATTAGGCC
122	TGCGCCAGTGAGTCGTATAT
123	CAGCAACGTGGATCAACTAT
124	CAGCGGCTAAGATCAATACC
125	GCAGCCTAATCTGGCCTAGT
126	GGGCCTGTACCTGCAATTCA
127	TAGGCCGGACCTGCTGTTAT
128	TAAGCCGCCACGGAGTGTAA
129	TAAGGCTTGTGAGACGTAGT
130	TAAGCCCGATCAGCATGGAC
131	TTGCCCGTAGTCAGCTAGA
132	GAAGCACCGATCAGACACTG
133	CAGGCACCAAGTAGCACAGT
134	GGTGCCTCATGTACTCAGTT
135	TCAGGCTTATCGAGCGCGTT
136	GCAGGCAGATCGACCTAGTT
137	GGATAGGGACTCAGATATAC
138	GCATGGTTACCTACGCCAGA
139	GGAGGCTGACTCATACGCAA
140	GGAGCCTGACCTAGTCGATA
141	GCAGGCCAATTGGCGATAAT
142	GGTGCCTGACATTAGGCCAT
143	GATCCCACATAGCGGACAAT
144	GATCCAATCTGTCAGCACAT
145	GAGCCAATCTGACTACCAGT
146	TGCTGGATATGACTGTCGTA
147	TGCTCTGCACTGCTGACGTA
148	TCACCAAGCCAGACTGTGTAG

Seq. Id	3' to 5' sequence
149	AGGAGCAACCATCATGCACG
150	GGGCATACCTATCCCGAGAT
151	CGGGCGATACCACTCAGATT
152	AGCGGCAACCAGACATACGT
153	CACGCCATACCAAGGAGAGT
154	CAGTGCATACCAAGCGACGA
155	CAGGCAGTACACAATCTACG
156	TACGTCGCATCCATAGCTGA
157	GAGTGACACCTCAGCAGATA
158	CTACAGCACCTCAGGAGAGT
159	CTCACGACATCCAGGAGTAT
160	CCAGCACGACAGAGAGATGT
161	CGCACACACCTGAGAGAGAT
162	GCGCACGCACAGATGTAA
163	AGACGCTCAACCACGAGAGT
164	GACGCCACAGTCACTAGAGA
165	GGCGCACACTGTACTCAGAT
166	CGAAGCGCCAGTACCAAGATA
167	GGGTGCGTACCTACTCTGAT
168	GAGACATGATCTACCAAGTAC
169	GGACGCTTACTCAGCAGTCA
170	CGGGTGTACAGAGCTATCA
171	CGCGGCTTACACAGACATTA
172	CGGAGCTTACACATTAGCAG
173	CTGAGCATAACATTACGAT
174	CCGATCATAACTGTAGATGC
175	CCGCCGATAACTGCTTGAGA
176	GGCCATATAAGAGATGTAGA
177	CGTCCCTAACGGCTGGTAT
178	ATACCCAGAACGACTATGCG
179	ATCCCACGAACGATGAATCT
180	ATCCGCAGAACCGGGCGATAA
181	CCTCGCCGAAGCGTGTAA
182	GCGCCGCACAGAGTCTTATA
183	CGCGCTGCACAGAGCATATA
184	CCGCTGACACAGGGCAGATAT
185	GCGTATGACCAGGTGTATAT
186	CTGTATGAAGGTGCTGTACT
187	GTTCGACAGAGGATGTATC
188	GTGCTCGCAGAGGATTATC
189	TAGGCCAGAGTAGCGACTTA
190	CAGATCCTAACAGAGCAGTTAC
191	TAGATGCTAGGAGCGATTCA
192	TAAGTCGGTGGAGCATATCA
193	TAAGCGCGTGGACTCCTAAA
194	TAAGTGGACTGAGCGCATAT
195	TATACGGCAGTGGATCAGAT
196	CTATACGCAATGCACTCAGA

Seq. Id	3' to 5' sequence
197	CTATCGTCAAGTGATGGACC
198	TATAGACTAGGTGATCGAGC
199	TAGTACGAGTGGGCATCAA
200	TAGACGTAGTGAGCATGACT
201	TGACGAGTTAGGATCTATGC
202	TTACGAGTGTAGCGTCCATG
203	TCGTCGTAGCATCTCGCAGT
204	TCGACGTAGGATCGCAGTAC
205	TCAGTATCATGGAGTACGAG
206	TGCACTAGATGGGATCGACT
207	TGCGATTACTGCCGTACGT
208	TGGACTCTATGGCAGCCGTA
209	TGACAGCAGTTGCAGTCCGT
210	TACACAGGCTTGCAGCTCGA
211	TGCAGCGGAGTGCCTCATTA
212	GCGCAGGGAGATCCATATCA
213	CGGCAGCCAAGTCCAGTATA
214	CAGCGCCCAAGACGTGTATA
215	GTGCCTGCATAGCGATAGTC
216	TGCCTGCGAGAGCCTGTATT
217	TGGCATCGAGAGCCGTTCTA
218	GCAGGAGCAGAGCTTATATC
219	GCGGGATCACGACGTTTACA
220	GTGGCGATAGAGCATTCTCC
221	AACCGGAGAAACCATTGCC
222	AGGCAGACAACCTCAATCCGG
223	AGGAGAGCAACCTACACTCG
224	AGCCAACGAACCTACATGGG
225	CCGCAAGCACGTCGAATGAA
226	GCGCATGGACGACAAACGTA
227	GCCAGGAGACGTAGATATTA
228	GCGCATAGAGAGAGATCATC
229	TGGTATATCGGTAGATTCGC
230	GAGCTATAAGGTGGATTCAC
231	CGCGGATAACCTGATTCAAC
232	GTCGGCTTACCTGATAGCGA
233	GGAGCTATACATGCCTATCC
234	GGTGCCGTACATGCTCGTAT
235	TCGGCTTGACGTGCTCGTAT
236	GGGCTGTGACTAGACCTCTCA
237	GCGAATTAGTAGACGCACA
238	GAATCTCGAATAGCGGTACA
239	GACAGTTGACATGACAGTAG
240	GACATTGACATCGCATACAC
241	GAGTTAGAATCGTGAGCAC
242	CTATTGCGCAAGTGTGAGCC
243	GTTATGGACACTGCTCGACG
244	AGCGTTCTAAATGCGTCACA

Seq. Id	3' to 5' sequence
245	CCGATATGAACGTCACTAC
246	CGCGAATGAAGTCTACATAC
247	CCACTATGAAGCGATATAACC
248	CACCAGTGAAGAGATACCGC
249	GCACTGTTACATGATAACCTC
250	GCCAGTTACAGTCATGCCCTA
251	GCGCAGCTAGATCCACTGAT
252	GCGTGCAGGAGACCTCATTAA
253	GCTCACGAGGCACGCTTAT
254	GCGCCAGTAGCACGCTTATT
255	GGCTCAGTAGCACTCATCAT
256	ACTTGCACAGCACAATACGT
257	CGCCATACAGCACGATATTAA
258	CCGCAGACAGCACGAGTATT
259	CCAAGGGAGACTACACGATCT
260	GCACAGGTAGCTGACGTAT
261	GTCAAGATGCTACCGTTAG
262	CGATATGAAGCTCAGTGAAC
263	CCTATGAAGCTATCGCAACA
264	CTTATCACAGCATCCGAGAG
265	CCCGTGCAACGATTGACAA
266	CGGCGGTTAAGTTCAATCA
267	GGTCGAGCATGATAGCTTAT
268	GTGGTAGCAGCATAGCTTAT
269	TAGCGTGGAGCATCCTCAGT
270	CAACGGTGAGCAACTATCAG
271	CTGGTTCGAGCAATCTATCA
272	TCGGGTCTAGGATGCTCTAC
273	TCGATGCACTGATGTCACTA
274	TCGTATATCCCATGCGATCT
275	TACGGTCCAGCATCAGCTTA
276	ATCAGTCCAACCTACAGATG
277	ATCAACTGAACCTCATACGG
278	TACTTCTGAGCAGGGAGCTA
279	TAGTTATGAGCAGGCGTCCA
280	CTTGTGACATCAGCCACGAT
281	CACGGAGCAAGAGCACATCT
282	CACGGGTGAAGAGCCATACA
283	CAGGAGTTAATAGCTCATCC
284	TAAGATTAGTTAGCAGCGCC
285	GAGTGATTAGCAGACGCCAC
286	CGATGATTACCAATGCCACG
287	GACTGATTAGCACATCCACA
288	GATTATGTAGCACTATGCC
289	GCTATATTACGAGCTATGCC
290	GTTTATATCGAGGCAGGCCA
291	GTTACTATCCGATCAGAGCG
292	CGTCATGTACCATCAAGTCG

Seq. Id	3' to 5' sequence
293	GTTATCTACGGATCATGCGA
294	CTGCCGTAAGTCTCATGCGA
295	CTAGCCGAATACTGCATACA
296	CTGCGTCGAGAACATCGCGTTA
297	CATACACGACAATAGCTTCG
298	GATACCGACTCATACATTGC
299	GATACCGCACGATCAGCAGA
300	GTATATGCAGACTACTGGAG
301	TATAGTCGATTATCCCAGCC
302	CATAGTACAATATCCCGACG
303	CTTGACAGCTACTACCAGTG
304	CTGAGACAGCTATCGACACA
305	CTGAGTAAGTCTCCACACG
306	TCGGATATACTATGCGTCAG
307	CGTAGGATAGAACATGCACAGT
308	CATGATACACACTCACGAGG
309	CGGAATCACGACTACATACG
310	GGGTATCACGAGTCACCTCA
311	GAGAGAACATCGTATCACAGCC
312	GAGTATGTAATCTACCTGCC
313	GAGTAATCATAGTAGCAGCC
314	GACTATATCCAGCACCGAGG
315	GACATATAGCTCCACTCAGA
316	TAGACCTAGTTGCAGCGCGA
317	TACTACACGTTACGGCAG
318	GTACATATCTGTCACGCGCA
319	TAGTATATCCTACGCCGCTA
320	GAGTATATCGCAATGCCAGC
321	GAGTTGTCACATAGGCCACC
322	GACGCATGACATATCCTAC
323	GAGACACTTGACAGTAGCCA
324	GGCTAGTTACTCAGATCACA
325	CGCAATAAGTCTAGCTCACT
326	CATGTACTAACGAGTCACAC
327	CTAGTTAATGTCATCCGGC
328	GAUTGTTAACATTGCAGC
329	CGTCGTAATCAGCACAGC
330	ATTCGGTACACAGCACAGA
331	ATCTGCTGACACACACTAAG
332	AGCTCGCTAAATATGTAGGC
333	ACTGTCGCAAATATCACACG
334	ACTGTCGACCAACCAATAG
335	GTTACTAGCTGGACCTCAGA
336	TTATAGACTGGTGCAGAAC
337	TTAGCATACTGTGCGCGAAC
338	TGTGCTGACTTAGGTCGAAT
339	TCTCGGGACGTTGCGCTATA
340	TGTCCCGACGTTGGCTATA

Seq. Id	3' to 5' sequence
341	TGTTCGTGACTGTGCGCTAC
342	TGTCAGGTACTGGTCGCTAC
343	TTCATGTAAGTGGCTACCG
344	TTTACTAGAGTGGCGCATGA
345	TTAGATAGATGTTGGCCAG
346	CTCAATAGATTATAGGCGCG
347	TCGAATCGCTGTTACGGAAA
348	TCAGACTAGGGTAGGCCATA
349	TCAGCAGTATGTAGGCAGTA
350	TAAGCCGGGTACGCTATT
351	TATGACCGATGTGCAGGTAT
352	TTAGCACGCTCGGCCATGTT
353	TTCACACGGTCTGCGAGCTT
354	CTTCAGACAGGAGGAGATAT
355	TCCAGCCGACGTGCGATTAA
356	TCCAGCGTACCTGCTTAG
357	CTCCAGTCAAGTGCTTCGAG
358	CTCCAGCGAAGTGATGAGAA
359	TGTCAGCGGATGCCATATA
360	TCCATGCGAGGATCAGGTAT
361	TGCAAGCAGTTCTCAGCGTA
362	TGTAGGACCTGTGCTCACTG
363	TTTATCGCAGTGCTCAGGCT
364	TATGTCAGCAGGCCAGCTT
365	TTCTCGTAGCTGCGCTAGT
366	TATTGAGCTAGGGACGCAT
367	TATTTATACTGCGAGCGAGG
368	GACCTTACACTGGCACGAGA
369	TAATGATAGCATGGGACGTT
370	TCGGATAGCAGTGCCTCTA
371	GCTGATGCACGAGGCCATTA
372	GCTGGATCACGAGGCCATCA
373	CGCTTTGTACCAAGGCCATAG
374	CGTGATTGACCAAGACCCAGT
375	TACGCTGGATCAGACGGTCA
376	ATCCTGAACGCAGAGACACG
377	ATCGTTGCACCAAGAACTACA
378	CTCTCAGGACCAGCATGATA
379	TCTGAGCGATCTGCCAGTCA
380	GGTGAGACCTATGTATATCG
381	TTAGAGTCTTAGGCATGTCG
382	TTATAGCCGTAGGCAGGTAC
383	CTCTAAGTATTGGACACGCA
384	GCTAGGATATAGGACACTGA
385	GCTATCGAATGTGCAGTACG
386	TCTATCCACTGCGGACGAGT
387	TCATACTCATGTGCAGCTCT
388	TCATCGAGATCGGCCACTGT

Seq. Id	3' to 5' sequence
389	CTTATGATACCAGTCAGCAC
390	TATTGGTACGGAGTTAGCCC
391	GTAGATGACCCAGTTCCAGC
392	GGCTGTTACCGAGTCTCAGA
393	TGCTAGTTAGGAGTATCGCA
394	GGCTTACTAGCAGTCACGCA
395	CAGCATATAAGAGTCGTACC
396	GGCATCATAGACGCTACGCT
397	GAGTCAGCAATCGCAGCTAA
398	GATCAGTAATGCGGAGCAAC
399	TATCATAGATGCGGACGGAT
400	CAGTCCACAAGCGCGAGTAA
401	CGTAGCCCCAAGTGCCGATAT
402	GACGCACCACAGGCTAGTAT
403	CTAGCATACCAGGCGAGAGT
404	AGTGCATCACAAAGAGACTCG
405	GCCATAGACGAGGCAGTATC
406	GGAATACGCTGAGATATAACG
407	GTAAATCGCTCAGCAGCATT
408	CACAAGCGACCAGAACCGTT
409	TCTTATCGACCAGGGCGGTT
410	GACACTATCCCAGACGGAGT
411	TTACTAGGTTCAGCGCGATC
412	TTCAAGATCCTCAGCGTAGTC
413	TCTCAGATATTCTGAGCAGC
414	TGTCTATTAGTAGCTGCGAG
415	TAGATACTCTGAGCTAGGAG
416	TGTCTCCAGATCGTGCAGT
417	TTCGGTCTAGCTGGTAGCAT
418	ATCTGGCGAACAGGTGCATA
419	AATGCGCGAAACGGCGATAC
420	TTTGTGCGAGTAGTCGCATC
421	TGTTGTGCACTCTCCAGGCA
422	CATTGTGAACTCTACGTCAG
423	CGGATGTCAAGCTCTCACAG
424	CTGCGGCAATACTCTCAGGT
425	ATGCGGAGAACCTCTGACAA
426	GCGCGTGAATCCTGTGACTA
427	GCGCTCTGAATCTGTGAGAA
428	GCGCTATGAATGTCAGCTAA
429	GCCGAGGTAATGTGATATAC
430	GCCGCGTGAATATGAAGATA
431	GCGGGCGAGAACCTTCCGATA
432	GATGGTAGAACATCTCTCAC
433	GCTGCGGGAGACTATCATCT
434	GCTGGATTACGATGCCATAG
435	GTTGATTACGATGGCAGAT
436	CTTCACGCAAGTTGTCCAGA

Seq. Id	3' to 5' sequence
437	CTTACGCCAAGTTGTCAGAA
438	CTTGCCTCAATAGTCTGAGA
439	CCTGTGCGAACTGTCTTACA
440	CTCAGTCCAAGTGGCTCAGA
441	CCATAGCGAAGCGCACAGTA
442	CCAGCACTAAGCGCAGATAG
443	CTCCGCCTAAGTGGCAGTAA
444	TGCGCCTGACGTTGGATTAA
445	TGTCCAGTAGCTTGAGAGTC
446	GCTCACAGAGTTGATAGAC
447	GCTACAGGAGTGGATATTAC
448	GTGACAGTGGCAGATATAAC
449	TCGCACGTGAGCTGTAATCGA
450	TCTTATGAGATGTAGCTCGC
451	TCCATCTAGCTGTAGCCGAA
452	GTCATAGCAGCTTAGACCTA
453	TTATGCTGACTGTGCTCGAC
454	TTAGTGCAGTATTAGTCGCG
455	TGTCTGACCTTGTAGCCGAC
456	TGTTGACACTTGCCTACCGG
457	TCTTAGCATGTGCGACGACG
458	GCTAAGCTCTGCACTGACG
459	CATAAGACTTTCCAATCGCG
460	CTGAAGCACTTCCACGAAG
461	CTGAACCCGTTGCAGAGAGA
462	CGGAACCGATGGCACAATAT
463	GGTGACCGATGGCTACTCAT
464	ATGGCGCGAACCTGTACTA
465	CATCGCGGAAGCCACGTATA
466	GACGGCAGAATGCAGTATAT
467	CGCGGAAGAAAGCATATTG
468	CTCAAGGGCACGCAATCTAG
469	TCACAGGAGGCTGACTCTA
470	CGACAAGGCATTACACTAG
471	ATAAAGGTCATGCCAACCGC
472	TATAATGCGTTCACGTCCC
473	TCTAATGCCGTGACACGAAAC
474	TGAATGCCGTGACTCGTAA
475	GTGGAGGCACTGCATCATAA
476	GTGGTGTGACCTCGCCATTA
477	GGAGATGCACTACGGACTAT
478	GAGGATCGAATACTGTCGTA
479	CGGAGAGCAAGTCATACGAC
480	GCAGGGAGACGGACTATACTA
481	GAGCGTGTATCCGATCTAA
482	CGATACGGAAGGCGCACTAA
483	CGATAGGTAAGGCGACTCAA
484	GATGTGGCACGACGATCATA

Seq. Id	3' to 5' sequence
485	TGAGTAGGCAGTCCGATCTA
486	TGATAGGCAGTGAGTTCATC
487	TTATGGCGAGAGTTGTCATC
488	GTTAGGCACGATGCTGTAT
489	GCGTTAGGACCATAGTCTAC
490	CCGATGCGACAATACGTTAG
491	TCTAGCGTCCCATAGCGTAG
492	CTGTCTGGACCATAGCAGCA
493	CTGCTTGCACGATGAGCGAA
494	TAGCCCAGACGATGTAGTCA
495	CCGCTACAAGCATTGGAAT
496	CGGCTAGAAGAATGAATGCT
497	CCGATGATAAGCTAGTATGC
498	GCGGATAGACCATTATTGAC
499	GCCACTAGACCATCGGTGAT
500	GCACGGGGACCATCGTTAT
501	GCCGCTCGACCATAGTGATA
502	GCCGAGTCACCATGCTGTAT
503	CACGGGTACCCAAGCGTATT
504	GACGGCGACCCAGGTTATAT
505	TGTGCGTCAGCAGTTAGTAT
506	GCTCGGCTACCAAGTCGTTAT
507	CGCTGGACACCACTGTGATA
508	CGGTGGAGACCAAGATTATAT
509	CGCGGGACACCAAGCATATTA
510	GCTCGCGCATTAGCATATAA
511	GCTGACATCCACGCATTGAG
512	CGCTGATCCACCGAGATTAG
513	ACGCAACCAACAGCGAGTGT
514	CACAGACCACAAGCTATGGG
515	CCTAGCCCAGGCATTAGAA
516	CCGTAGCTCCAAGGCATGTA
517	CAGTGCGCCAGAGCAAGTAA
518	GAGCCACCAACGAGTCATGTA
519	GGTCACCAACTCAGCGATGTA
520	GTGTGCCACTAGGCCATT
521	GGAGACCCGTAGGCATAATT
522	CGCTGTAAGGATGCTGAATA
523	GTCGTGCAGGATGCCATATT
524	GTTCGGCACGATGCCAGATT
525	GCTGCGACCATCGTCAGATA
526	GTCTAGCGATCATGCTCAAT
527	CTCTACGAATCATGCGGAAG
528	CTTAGATACTACGAGCACGA
529	GTGACGCTACGTGAGCCTAA
530	TACCGTGTACGTGAGCGCAT
531	TACTGCGACGTAGCGAGTCA
532	TACTAGGTACTCGCGGCACT

Seq. Id	3' to 5' sequence
533	TACTGCGTACTCGGAGCATA
534	GCTCACGTACTCGACAGAAA
535	GTGTACTATGTAGCGAGATC
536	TAGTAGTACGCTGTCAGAGC
537	TGTCGTCGAGTCGTAGATAC
538	GTAGTACACGGAGTGATCCT
539	GTAGTACGAGCTGAGACTCT
540	GTGACTAGCTCGTAATTCTG
541	GAGACACGGTACTAGAGACT
542	CAACAGCGTCACAGACATGG
543	CTATGAGACCAACCTCGATAT
544	ATTCGGCGACAACGCATTAA
545	GTTGCCGTACTAGGGATACT
546	GGCGCAGTACGATTGACTAT
547	GTGCGACGAGCTTGTCACTA
548	TGGGTGTGACTATTGATACG
549	CGTCTGCGAACCTTGCTACG
550	CTGTAGCGAAGTTCTCATAC
551	TCGGCGTTACGTGCTGACTA
552	TGAGCTATACTCGTCGTCAG
553	CCGATACTAACGTTACGAA
554	CGTCATACATAGGACTAGCA
555	CGCACGCTACAGACTATTAT
556	GCGAGCGTACTATACATAAC
557	GCGAGTCTACGACCTCTATA
558	CGGTACGCACGACAGTCATA
559	CGGTACATACGACTATACAG
560	CGCTAGATAACCAACTGATA
561	CTCTAGGTACACTACTGCAT
562	CGTCAGAGACACTGGAATAG
563	CTGCGCGTACACTCGGATAT
564	CTGTCGCTACACTCGTGAGA
565	GTAGACGCCCTAGTCAGATAG
566	GAGCGACTACGAGCCACTAT
567	GTGCGACTACGTGCATCACT
568	CGTAGGACACGAGCGTATAT
569	GGCGACGACGTGACTATACT
570	CGGTCACGACGACGAGATAT
571	GCGTCACACGAGCCGATATT
572	GTCGCTCACCGATGCGGATTT
573	GACCGACAGATCGTGACATC
574	GACCACGTACATGAGCTGAC
575	GGCGACGTAGATGATATTCT
576	GAGACTGTAATCGCATATCC
577	GACTATGTAATCGAGCCTAC
578	GATAGTCGAATCGCGGATAA
579	TATACGGACTGCGCCCTAGA
580	TAGTCTAGCTGAGCCATCGA

Seq. Id	3' to 5' sequence
581	GTATATGACCTAGTGCCACG
582	GTGTTGTACGTAGTGTGCTCCA
583	GAGTCTGACATAGGGCACCT
584	GAGTTGCACGTAGACGATAC
585	GACTCGCGCATAGACACATG
586	GACAGGCTACGAGACTAGAT
587	GTGACGGCACTAGCAATATA
588	CTGCTCTGACACCGAGTAT
589	CGGCTGTGACACGAGCTATT
590	CTGGTGCACACGCCCTATAT
591	GTCAGTGGACTAGCCCTACA
592	ATCGAGTCAACCGGCCTAGA
593	TCGATAGCCTACGTGCCGTT
594	GGAGACCTCTACGCACTGTT
595	GCGTGACAGCTCGCACTATA
596	GCGTAGCTCAGCGACATTAA
597	GCTATACGCACCGTCATGTA
598	CGCATACACTCAGCAGAGAT
599	CTACTTACAGCAGCGACAGAG
600	ATCTCGACACAAGCTAATCG
601	CATCGGATACACGCATACAG
602	ACATACAAACACCGCTTAGGG
603	TACTGAGTCCACGCTCGGTA
604	GATACAGCCTACGACCGGAT
605	GATACATTACTCGACACGCG
606	CGCTACAGAGATGCACAGAG
607	CCGACTGTAACTGCGATGAA
608	GGTGTATACGTGCATAGCC
609	CTCGTATTAAGTGCCTACCC
610	TATAGTATCGAGGAGCGACC
611	GTATAGTACGTGATAGGCTC
612	GTACGATACGTGACTAGAGC
613	GTAGGTCGAGCTGCATACTC
614	TTACAGTAGTCTGCATCCCT
615	CTAGTCAAGTCTGCATACAG
616	CTGTCTAATACGGCCACATA
617	CTCGCAATACGTGTACCGTG
618	TCCGATCTACGTGACGGTGA
619	TCTCGCCGACGTGGCTTAA
620	TCTGTCCACGTGCGGGTTAT
621	TCGTCCTGACTCGCTGGTAA
622	GTCCCTAGACTCGCAGTGAT
623	GCGACAGTAGCTGCAATGAT
624	GACGTAATATGCCACATCA
625	GACGAGGTACAGCGCATACA
626	GCAGGTCTACGACGCATGAT
627	GCAGAGTACGGACGCATATC
628	GAGTAGATACAGGTCACGAT

Seq. Id	3' to 5' sequence
629	GAGCGATCACACGTCCGATT
630	GGTCGCATAGACGTATCGAT
631	GGTGTCTCACGAGTATCGAC
632	GTAAGCTAGACGGTCCACTA
633	GACGGACACTGAGCACATAG
634	GACACCTATGTAGCAATGAC
635	CACAGTACAATAGCACCTGG
636	CACCAGAACGTAGGCACAGT
637	CACTACTCAAGAGCCAGTTA
638	CGCCGACGAATAGCCAGATA
639	GCCGCACTACTAGCGATGAA
640	GACCAGTTACGAGCAGCGAA
641	GATCACGTAGGAGCACCCTA
642	GTACGCAGAGGAGTCATCCA
643	GTCGCTGACTAGGATCACGT
644	TACGCAGACTCGGACTCGAT
645	GTCGCTATATCGGACCTAAC
646	ACTCGCATAAACGACAGTCT
647	TGGAGTCGAGTAGTACATAC
648	TACGACATGGTAGGACGCTA
649	TGACTTCTACGTGGCGATAT
650	TACGCTCCGAGAGGGCGATTT
651	CACCTTCGACGAGCAAGAGT
652	TACGCTCGCTCAGCTTAGGT
653	TACGGCATCGACGCTATTGC
654	TACGGCGACTGAGATGCCAT
655	TACGTGCTAGGAGATGTAAC
656	TATCGTCTATCAGATTGCC
657	TATCGTATCCACGTTCCGAG
658	GATCGTACATCAGTGTCCAC
659	GAGTCTATATCAGTAGCGAC
660	GTTAGTCGATCAGTAGAGCA
661	GTCCTACGATGAGTGACGCA
662	CGTCTTCTAACGCGTGTGAA
663	GTCTCCTACCGTGAGCAGTA
664	ATCTCACTACAAGAGCCTAG
665	CTGTGACGACCAGACCGCTTA
666	CTGAGCGTAAGTGATTGTAC
667	CTCGTAGCAATAGATTTCCC
668	CTACGTGCAATAGCAGCTCA
669	CCGGCAGTACAGATAAGTCA
670	CGCCGGATACAGAGTAATCG
671	CTCAGCATAACATAGTACAGC
672	CCGAGCTTACAACGTGTGCA
673	GACGCATTACCACTGGCGAT
674	CAGGGTGTACCAACGAAGCAT
675	CGGTGTTACAGCAATCCAT
676	CTGGCTGCAATAGCGCGATA

Seq. Id	3' to 5' sequence
677	TGGGCTACAGTTGCGCTCAT
678	TCTGGCATAGCAGGTGTCAC
679	GGGATTCTACCAGTTCGCAC
680	GAGGATGCAATCGTAGTCAA
681	AGGGATAACCATGCACACCG
682	CATGAAGACTTTGCACTACC
683	CGCCGACCAATGGGCATATA
684	CCCGAGCCAACTGGAGATAA
685	CCCGCAGCAACTGGGATTAA
686	GCCATAGGAGCAGCGATTAA
687	CCGCTTGCAGCAGACAGGATAT
688	CCGTTTGCAGACAGCCAGTA
689	CCGTTTACAATGAGCACACA
690	CGTTCTTAATGAGCGACAG
691	CGAGCCTTAATGACGCACAA
692	GGCAGCATACTCACGATCAT
693	CTGCGAGCAATCAGCCGATA
694	CCGCAGCAAGCTATCGAGAA
695	CGGC GTTCAAGCAAACCGAA
696	CAGTTTACAAGCATATCCCG
697	CATTGACGAAGCATAGTTCC
698	CATAGTGCAGCAGCGACAC
699	ATCTGTGCAACCATA TAGTACC
700	ACTTGAAATGAGAAGCCC GT
701	CAGGAGAAGCGAATAGCCTC
702	CCAGAGAGAGCAATATCCGC
703	CAAGGAATATACAGGCCCGC
704	CAGAACTGAATTACAGCGCC
705	CATCAGACAATTACAGCTCG
706	CACCCGATAAGAGCATA CGG
707	CACTCCAGAAGCAGCAGTAGG
708	CAGCACCAGAAGCAGAAGTCT
709	CAGATCAGAAGCAGGACGCT
710	CAGACCATAAGCAGCAGGCGT
711	ACAACACAAATGGCGCGGCT
712	ACGGCAGATAATCACCTCGG
713	CAAGACAGAATACTCTCCGG
714	CACAATACAATAGGCTCGCG
715	CAATAAGACATAGGCCGCCG
716	CACAACGGATTAGAAGCGCG
717	GACATGATATGAGAATGCGC
718	AGCAAACATAAGAGCCGGGTC
719	AACAATACAACCGTCGGCGG
720	AAATAACTAACCGCCTCGT
721	CAAACACGAAGAGCCTGTCG
722	CACTAATCAAGCGACAGGCG
723	CATATACCAAGCTATCAGCG
724	CACATTCAAGACGATCACGT

Seq. Id	3' to 5' sequence
725	CACCTATGAAGAGACTCACG
726	AACTATATCAAAGCCCTGGC
727	ACAATACCAAATGCCCGGG
728	AGAAACGCAAATGCCTCTCG
729	CGAAAGCATAATAGCGGTGC
730	GGCAGAATCTCGTGTACTAG
731	GGTACATTATGCTAGAGAGC
732	GATACATGATGATAGCAGCG
733	AGAACAGGAACATCGCTGCC
734	AGATAAGCAACATCCTGTCC
735	CATAAGCTAAGATCCTGGAC
736	ATTAGCGAAGAAGCATGGC
737	ATAGCTCAATCAACGATGCG
738	TATATCGCATCCACTCTGGG
739	CATCTCGAAGCACATTGAG
740	CATTCGTCAAGCACTTCAGA
741	CATTATCGAAGCACGGTACA
742	GATTGGACAGCACGGCATA
743	GCTCCGGCAGTCACGATTAA
744	GACTGTCGAGCACCCATTGA
745	GATCGTCGAGCACGCCATAAT
746	GAGGTCAGACGACGCCCTATA
747	GCGCGTATACTCTCCATAG
748	TAGCGAGTAGCACTTCGATA
749	CTAAGTGTAGCACCACATCA
750	GTAGATCGAGCAGCCAGTCT
751	GACATAGACCATACCAACGTT
752	CGTCTCGAGCAAGTGCAGT
753	CTCTCCGGCAGCGATATGTA
754	CCCTCAGCACGAGATATAAG
755	CCCTTGCAGCATTGCGAA
756	CTCCAGGCAATGAGAGCACA
757	CCCAGATCAAGCGATGCAGA
758	CTGAATCCAATGTACGTGAC
759	CGGCATTCAAGGTAGCGACA
760	GCCCAGATTAAGGTGTGCAA
761	GCCCGATCAATGGCTGCATA
762	CGCCATCCAAGGGCTGTATA
763	CGGATGCCAAGGGCTTCATA
764	GGTTGCGCCAGGTATCTTA
765	GGTCCGGCATGGATCACTAA
766	GGCTGGCACATGATCGTATA
767	TGGTTGCACITGGATCGAAA
768	TGATTGCCACTGCTCATACG
769	TGTTGATCCATGTCCATAGC
770	TTAAGGCACCTGATCTCAGC
771	GTAATGCCCTGGACCGCAAT
772	GTAAAGCCTTCCACGGCAAT

Seq. Id	3' to 5' sequence
773	GTTGCGCCATTGAGCCAGAT
774	GTTGCCAACCTGAGACGTTA
775	AATGCGCCACAAAGCGAGTG
776	CACCGGCAAGAAGTACAGT
777	CATCCGCCAACGAGTGAA
778	CGTTGCCAATGCACGAGCTA
779	GATGGCTGAATGACGTTTAC
780	GATTGCCAATGAGTCTGAC
781	AATCAGCCAAGAGATGTGGGC
782	AATCATGCACAAAGTTGCC
783	ATTTAGGCAAGAAGCGCACCC
784	AATTGGCTAAAGAGCGCACCC
785	ACATTGGCAAAGCGAACTCC
786	AATGGGAGAAAGCCGACTCT
787	TGTGCTGGAGCTTCAGTCAC
788	GTTGTGCAGGATTATCGACA
789	GCTTGCAGACGAGTCATCAC
790	GGATGGATACTAGCGACTCC
791	GCTATGGCACAGGCATCTAC
792	GGACTGGCACATCCCGTATA
793	GGATCGGACCATTCTCACTA
794	GGATGGCGACATGCTCACTA
795	GAGCTGGCAATCGTCGTACT
796	GGATGGCTACATGATCTGAT
797	GGCAGCAATTGGGCTAATA
798	GCCTAGCAATGTTCCCAGAG
799	GAGCAGCAATGATGATCCAT
800	TGGTGCATAGCTGCGATCCA
801	GGCTGCACAGGTGTATCCAA
802	GAGATGCCAATCGGCCATAA
803	TATATGGCACATCGTTCGGA
804	TGATGCCACGTCGTCGTAT
805	ATTGATCCACACACAGTACG
806	AGCTGATCCAAGCAACGTAC
807	GTTGATGCGAGATCGCGTATC
808	TCGTGGGCAGATCGCTTCAT
809	TGTGGCCGAGATGCCCTCTA
810	TTTGGGACTTCGCTATCAA
811	TCCCATGCACCTGAGTGGAT
812	TTTCATGGAGCTGCGCGTA
813	TTTACCTGTGGTGTAGCGA
814	TTGTCATGCTGCCAGTCGA
815	CTTTCATGCAGGGCAGAGCCA
816	CCTTTAAGCTGGCACACGAT
817	CCTATCAAGGATGCACACGA
818	CCGTTCAGAATATGACACAC
819	TAGGTCAAGATCATGCGCGAC
820	ATGTGCATACAAGCTACGAC



Seq. Id	3' to 5' sequence
869	GGATGACGAGGTCTCACCAT
870	GGATGCGACGATCTCGACAT
871	CGTGATCGAAGGCTGCACAA
872	CTAGATGTAAGTAGCTGGAC
873	CGAATGAAGGATCGAGACCT
874	CGGCCTGGAAGTCACTCATA
875	GGCCTTGGACTACCGCTAA
876	TGCTTCGAGGGTCCCACCTA
877	TGCCTGGTACTGTCCGACTA
878	TGCTTGTGAGAGTCGCTACT
879	ATGCTTGCAGAACCGTCAGC
880	TGACTGTAGGGAGCCTCAAC
881	TGCTTGGCAGGATGTCTAA
882	GGCTCCGGCATGAGTATATC
883	TGCTTGCAGTGAGGCTCTC
884	CAATTGGAACTAGCCTTCG
885	TTTGCTGCATCCGGCCTGTA
886	TTGGGCCACTGCGCTTTA
887	TGTGAGCCCTTGGCACGTTA
888	GGTGGCCCGATCACATTCAA
889	GGCAGGGCACCTCAGTTAT
890	GGGTGGCCCATGCTATCTAA
891	GTCTGGCCCTACCTATGGTT
892	GCGGGCACACCTCTGATTAA
893	GCGGGCGCACCATTCATTAT
894	GGAGCCCACCATGAGCTATA
895	GAATCTCCACCAAGGCGGATA
896	GGATACGTCGCTACAGTGAT
897	TCGTATAGCTGTATCGACGG
898	CTAACTAGCTGTAAGCGACC
899	ACTAGATAACAGATGCGCCG
900	CAACTATCATCAAGACGGCG
901	CAACAGAGATGAAGCGCGTC
902	CAACATATCATAAGCGCGTC
903	GCAGATAGCATCATATACGC
904	GCAGACTGAATTAGCTCTAC
905	GTAAATTCTAGCGCGAC
906	AGGAATCTAACCAACGCGCAG
907	AGACCAATAAGCACCTGGG
908	AGACAAACATTACGCCGGG
909	AGAATAAATTACTGCCGGC
910	GAGCACATATTATTACGCC
911	CAGAAGATAATATGCTCGCC
912	GAATAGCCGATAATCTCAGC
913	GAATAGCTTACACTGCCCT
914	GAATCACTCTGAATGAGCAC
915	GGATCACACTGCCGGACTAT
916	GGACCCATAGCACTCTGATT

Seq. Id	3' to 5' sequence
917	GAGGCATTAGCACCAGCTCT
918	GGATTATCAGCACTCAGTAC
919	GGGATCTCAGACGATGCTCT
920	GGGTATATCAGCGGATTCCA
921	GCAATTGATCTAATGCTCC
922	ACCAATGCAAATAGGCGGCC
923	AGCAAATTAAACACTTGGGCC
924	GAAACAAGCAGATTGCGGC
925	TTAATTCCGTGATATGCGCG
926	GGATCTAATGGTTATGACCG
927	GCATGAAGTGGTGTCAACTC
928	GCTTTAATGGTCGTGACGCC
929	GCTTAGAATTAGTGCAGGC
930	GCGTCAGAATTATGCCACA
931	GCTAGATAATTAGGCCACG
932	GCTGATAATGCTGAGGACTA
933	GCAGAATTGCATAGACGCAC
934	GCATGATTAGCATAGACGGA
935	CCAGCAATAGCAATCACGGG
936	ATTGCACATTCAACTGACGC
937	TGGCATTACTTAGTGCAC
938	GAAGCCATATCAATGCTCAC
939	GCGAGCAATTCTATGCCACT
940	GGCCCAAGTTGTGACATGA
941	GGGCATAATGGTTGATACTC
942	TTGGTGCATGGATCTCTCCC
943	TTTAGGGCAGGTTAGCTTCC
944	TTATCCGGCTAGAGTGCAC
945	TGATGACCTGTTAGCAGTAC
946	GGACCATGTGCTACGCAAAT
947	GTGAGCAGATTCAGCCAGAC
948	GAGAGACCATTGAGCCGATA
949	GCGTCGTCAATGTTGCCACT
950	GGGTTAATCCCTGCCACGTA
951	GTGCTGACATTGCGCCATT
952	GCCTGTAATCGTGGCACAT
953	AGCGCGTAAATGCACATAC
954	AGCGTCTGAAATGCTATCAC
955	AGTGCAGGAAATGTTCTACA
956	CGTCGCCAATATGATCGAAT
957	CGCCACAAGTCAGGCGATA
958	GCCCTACAGCGTGAGCTATA
959	TGTCAGTGATCCGGGACTAT
960	GTTATCGCACCTGAGGCGTA
961	GTTGTGACCTCTGAGCACGT
962	GTTTCACGCTATGCGAGCCA
963	GTTTACCGCTCTCCAGGGAT
964	TGCGTACCTCCTGCATGGTT

Seq. Id	3' to 5' sequence
965	TGACTACCGTGTGCGATACG
966	TGGACTACGTGTCTCGATAG
967	TAGTGATACTGACTCATGGC
968	CGTCTGATACAGCCCAGTGT
969	GCCGTATCACGACGCTAGAT
970	AGCTCGATAACAACGCTAGAG
971	ATCTACTTAACGCGCTACAG
972	GACATCGTACCACTGCGTAG
973	GAECTGTGACCACTCTGTAG
974	GAECTGGACCATATCTACGG
975	CACTACGCAAGACTATGTAC
976	CGAGTCTCACAGCAATCTAG
977	CGATCTAGCACGCAATATAC
978	GACCAGCGACGACAGTAGAT
979	CGTAGACAGGCCACGCAGTTA
980	CGTATGCTACCAACCGATTAT
981	CGTGCATAACCGAGCGTAGAT
982	CTCCGTACAGCAGGCAGTAT
983	CTCGTGTACAGCGATCACT
984	CTACAGATACTGAGAGAG
985	CTACGCGACACGCATGAGAT
986	TAGACGCTCGCACGGTAGTA
987	GCCGCTAGACGACGGTATAT
988	GTATCACTAGGACGAGGTAT
989	GTACTCACAGTGCAGAGAGCT
990	CGACTACACAGCTCAGGATA
991	CACCGACAACTCGTAGAGAG
992	CGACCCACACTAGGAGAGAT
993	ACGCGCACAAACAGGAGACTT
994	AGTACCAACAACGACGTG
995	AGTACAGCAACGCAGAGCCT
996	GTCAGCGACCGTCAGCTATT
997	GTCAGGCACTAGGAGCTATC
998	TGTCGGTCACTCCTGGACTA
999	TCGGTTACGTCCGCATGTA
1000	TCGTTTACCTGTCGCGCTGA
1001	TGTGTCTCACTCCGCGAGT
1002	TCTGAGCACTCTCTCGTAGG
1003	GTTGATGACTGCCACACGT
1004	CTGAGATCACAGCAGACTAG
1005	TTAGACTCCTCGCCGGTAGA
1006	TATAGCTCCTAGCAGGCGTA
1007	TATGCTCCACGTCTAGTGAG
1008	CTCTATCACCAGCGATGAGA
1009	CGCTCCAGACAGCATATAGA
1010	ACATACCGAAAGCTCTAGCG
1011	ACATCGCTAAAGCACATCGG
1012	ATATCGCGCAATCAACGCTA

Seq. Id	3' to 5' sequence
1013	CGATGCGCCACTCAAGGTAT
1014	TATGCCGACGGTCAGGCTAA
1015	TATGCCACGTCCGGTGATT
1016	TCTCGCTCACTGCGTATGAT
1017	TATCCGTCACTCCGTAGAGG
1018	TATCGACTATCCCTGAGACG
1019	GTATAGACCTCTCAGACGCG
1020	CTATCGTAATATCAGTCCGC
1021	CGATGACAATTAGGTACACG
1022	GAGCATAATGACGTAGACCG
1023	CGACAATACTGACAGCACG
1024	CGATGATAATAGAGTAGCCG
1025	CTATGATTAAGTCGTAGCCC
1026	AGGTGAATAACGCATACGCC
1027	GAGTGAGTAATGCTACGTCA
1028	GATCGACGAATGTTAGAGAC
1029	GACTCACGAATGCGGAGACT
1030	GACCGTCAATCGCGTCAGAT
1031	TACCCGCATCGACGGAGTT
1032	GTCAGCGCACTCCTGGTTA
1033	TCAGGCCACGTAGCGTTAT
1034	TTCGCGCTATCCATGCGTGA
1035	TGCTGATACTCGGCTGCATC
1036	TGAGTAGCATCGGTGACTTC
1037	TTGTATCACTGTGCTGCCA
1038	TTTAGTCAGTATGCTCGCGG
1039	TTACGTTTATATGGCCGAGG
1040	TGAGATCACGTTGCCGAGT
1041	GTATCATTAGCTCCGCAGAG
1042	TATCATGTAGACTCGGAGGC
1043	GTATGCTTAGATATGCAGCG
1044	TTGTAGTTAGCTCTGCACGG
1045	ATATCGTTAACGCCATACGCC
1046	ATTCTGATAACGCTCTCGAC
1047	ATTCGTCAAACGCGGTCGAT
1048	ATATGCACAACGCGCAATCG
1049	TTAGCTCTATCGCAGTCCGA
1050	ATTAGCTGAACGCCCTCGCAA
1051	ATTATCTAACGGAGGAGCA
1052	ATGTTGCTAACGGACGGACA
1053	ATGTGTTAACGGAGACAGA
1054	CTCTTCTAACGTGAGTCGAG
1055	CTGCTTGAAGTCGTCTCACG
1056	CTGCGTTGAAGTGGCTTACT
1057	GTGCGTTCACATGGCCGTAT
1058	GTAGCCGCACCTGACTGTAT
1059	GTAGCGCCACCTGACGTTAT
1060	GGCGCGTCACATGATACATT

Seq. Id	3' to 5' sequence
1061	GGTTGCTACGATGACTCAGT
1062	GAAGGCCCGTACACTCTATA
1063	GACAGGGCACACGACTCTAT
1064	TGCGCGGCACTCGTTCTATA
1065	GCGGTTGCACTCGTAGCATA
1066	GAGGCAGTACCCAGTCCATAT
1067	GGACGCTCACCAAGTGCCTTAT
1068	AGTGTCCAACCAGACCAGAG
1069	AGTGCCATACAAGCGCATAG
1070	GTAGCCTTACATTGGCAGAG
1071	GTCGCCGCACATTGGTTAT
1072	GTTGAGTCAGATTAGCAGTC
1073	TCGTAGGGACTGCGCTCATA
1074	CTCAGATGACAGCGACGCAT
1075	CTCTGAGGACAGCCGAATCT
1076	CTAGGATGACAGCCAGACAC
1077	CGTGAATTACATCAGACAGC
1078	CTGATTATAGCTCATACGCC
1079	CTAATATGATGACAGTCCGC
1080	TACTTATGATGACTGCGGAC
1081	GAACTATGCTGACAGTACCG
1082	CGATTCTGACCACATACGAG
1083	CTAATCTGACCACGAGACGA
1084	CTGTATTGACATCAGACGAG
1085	CTTCTCAGACATCGGACGAG
1086	GCACTGTGAATTAGCGAGCA
1087	GCCTACGGAATTGGCAGACT
1088	GACCTGGAATTAGCACACGC
1089	GCCTGCGAATTAGCGGACAT
1090	GCGATGCTAATGATGTGTAC
1091	GCCCCTGCTAATGAGTGGACA
1092	GCCTAGCTCATCAGACGGAA
1093	GCATGGACATCCTACGAGAA
1094	CGCCTGCCAAGCTGTGATAT
1095	GCCTGCGCCATCAGTAGATA
1096	GCACGGCCAATTACTCGATA
1097	GCAGCGAGACCATGTGATAC
1098	GCAGCAGCACACTGATCGTT
1099	GACCCAGCACATTAGCGAGA
1100	GCTCCTGCAATGTGCGGATA
1101	GCGCCTGAAATTGTAGCACGT
1102	GCCACAGCATTGGAGAGAAAT
1103	GCCAGGCTAATGGATAGTAA
1104	GCCCTGCGAATGAAAGACAT
1105	GCAGCGGAATTAGATATAC
1106	GCAGGTGCAATGATTCTACC
1107	GACCGGGCAATCACTTCAGA
1108	GCCGGGCAATGCGTTCATAT

Seq. Id	3' to 5' sequence
1109	CCCAGGGCAAGCGATCATAA
1110	GCCACAGGCAGGGCATATTA
1111	GCCTAATCCTGGGACACTGA
1112	TCGTCTCGATCTAGGCCATG
1113	GTGTCTCGACTCAGCCTATA
1114	GACGTAGTAATCATGTCTCC
1115	GACTTATAACGTATGCGACC
1116	ACGATGTAACACAGCGACCG
1117	AGTCGTGTAACCATGTGACA
1118	GTCGTGACAGTGATGTACTC
1119	GTGGAGTGACGTATCTCTAA
1120	TAGAGGTGACGTAGTCCACT
1121	GTCGTGCGAGATAGCTCTTA
1122	GTGTAGAGATATAGCATCGC
1123	TAGTCGTGAGATAGCGATT
1124	CAGTGTGTACGAATACGAAG
1125	CGAGTGTACATACCACATA
1126	CGTATAGCAGACAGCGCAAT
1127	GACATCGACGACAGGCCATA
1128	CGAAGCTCACGTAAGTCAAG
1129	TAGTGCTCACGTAGCCCAGT
1130	TGCCCACGGTGAGCTAGTT
1131	TAGCTGCCAGGAGCGTTCTA
1132	TCGGCCTACGCTGTGCATTA
1133	TAGGGTACTGATGAGCACTC
1134	CTACGGGAAGGTTAGCACCA
1135	TGGTGATAACCTGTGCCCTA
1136	GATTAGATAACCACTGCCACA
1137	GGAGTGATAACCTCGATCCAC
1138	AGCTGACGAAATCTTCACAC
1139	GAGGAGATAATGGTCACTAC
1140	CACGGAATAATACATCCTCG
1141	ACAGCAACAAGTCGAGCCGT
1142	ACGGAGAGAAATCAGCCCTC
1143	CAAGAGATAATACGGCTGCC
1144	CAAGTCTTAAGACAGCTACG
1145	ATAAGCGCAAGACAGGCGTC
1146	ATCTGAGCACAACTAGGACG
1147	CACAGGCTAAGACAGGAGCT
1148	CATAGCGTAAGCCAAGCAGC
1149	CATAGTCTAACGCCACATCAG
1150	GACAGTACATGCCAACATCAGC
1151	GCGGTAATCGGTGCATCAA
1152	GGGAGTATACTGACCATCA
1153	GTAGGCAGACCTGATCCCTT
1154	GAGCCAGACCACGCTTGATT
1155	GGCGCATCACTAGCCAGATT
1156	GGAGCTACATCCGCCAGTTT

Seq. Id	3' to 5' sequence
1157	GGAGTCTACCCAGGGCATT
1158	CGCGCTCTACACGATGGATA
1159	CGTGCCACACCTGGAGTAT
1160	CGCGGCACACAGTTCAGTAT
1161	GCTCGTCCACAGTGCAGTTA
1162	GCTGACGCAGAGTCCAGTTA
1163	CCGTAGCGACAATCAGCTTA
1164	ACGCACCGAAAGTGAGCGAT
1165	ACGT CCTCAAAGTGCAGACA
1166	ACGCAGTCAAAGTCATATCC
1167	CAGAGTCTAAGATCACCACG
1168	CACTGTCTAAGATAACACACG
1169	CAGCGTACAAGCTATACAGC
1170	CCGACGACAATGTACCGACAG
1171	GACTAGCGAATCTAATGAGC
1172	CGTCGAGCAATATGAATGAC
1173	CTGTCGCGCACTTCATAGGA
1174	CCGCGACCACGATAGAGAAT
1175	GGCACACACGTCTCGGATAA
1176	GGCAGACGACGTTGCATACA
1177	CGTGGGACACAGTCGATCAT
1178	AGTGCAGAACATCGTGTAA
1179	GGCAGCACAGCTTGTACGAT
1180	GACCATTGAATATGTCGAGC
1181	GTACGCATATTTAGCCAGCA
1182	GGCAATCTGTTCACGACCAA
1183	GCTGACTAATTGCTAGACAG
1184	GGTGTCTAATTGTATGCACG
1185	GTTGACACATTGTTAGCAGC
1186	TTAAGAGATTAGTCTGCCGC
1187	TCACGTAATTGTTAGCCGC
1188	TGAGTGATAAGCTCGGATCTC
1189	ATGATGATAACTACGTGCC
1190	ATGCGAATAACTATGACGCC
1191	ATGGAGATAACTATGCACCC
1192	TCGTTGCGACCTATGCGTAG
1193	TAGTCGCACCTACTGCTAG
1194	ATACGTGCAACCACTGCTAA
1195	ATGTCGATAACCTCTGCTAC
1196	ATCTAGCAACCTGAGCTAC
1197	AGTATAGCAACCTCAACTCG
1198	AAGACACTAAACTCTGCTCG
1199	ACGATAATAACAGCTCCTCG
1200	ATAGATATAACTGACGCGCC
1201	ACTGTAATAACCAAGCCTCG
1202	ACTGATAGAACACAGCGCG
1203	ATGGCGACACACATACAGCG
1204	ACGGCGAGAAATACGATGCC

Seq. Id	3' to 5' sequence
1205	GACGCGAGATCAATGTAGTA
1206	CGAGAGTAATCAATCATCCG
1207	CGAGCAATACATACATCTGC
1208	CAACATAGTTACACACGCTG
1209	CAGCTTATAGAGACACACTC
1210	CCATAGAAGTAGACACCTCG
1211	CTCAGAGACATGACACTCGA
1212	ATCAGGTCAACTAATCACCG
1213	AGCGCAGTAAATAGCTTAGC
1214	ACTCCACGAAACATGATTGC
1215	CTCAATATAGACACGATGCC
1216	CGCATTAGAGACAGATCGAG
1217	CGCACATGACATAGAGCAG
1218	CGCACATTAGACAGAGAGGC
1219	CTAGACTAATGCAGAGAGCG
1220	GCGTATAGATGCAGAGATCC
1221	TCACTAGCGTGGAATAGAGC
1222	CAGACTGAACACTCAATGTACC
1223	CACGATGAACTAGATGTACC
1224	CGAATGATAAGTATGACGGC
1225	CGAGATGCAAGTATAAGTACC
1226	GGATAGCGAGATATAAGACCC
1227	GCATAGCACGATGGACGATC
1228	CTCACAGGACATGCAATCGG
1229	TATACATGCTTCGATCACCG
1230	ATATCAATAACTGCGACGCC
1231	AATACGAAAGATCGGGCCCG
1232	ACAGATACAAATGTCGCCCG
1233	ACGAATAGAAATGTGGCCGC
1234	ACATTACTAAAGGTGCGACC
1235	AGATTAGTAAATGCTGCGCC
1236	ACTATGATAACAGCAGCCCG
1237	ATATGAATAACTCCAGCGCC
1238	AGACTGAAATCTACAGCCCG
1239	GTACTGATAATTGGATCGCC
1240	CCAGAACGGTTGCAGACACT
1241	GCAATAGTTGGACCCAGGCT
1242	GGAATAGGTGGACTCACTCA
1243	GCACAAGTTCGCGCATCGA
1244	GCGGAATCTGTGCAGCATCT
1245	GCGAGAATATGGTGACATCT
1246	GCGGTCAATTAGTGGACTCC
1247	CTCCTACAATGGTGACACTG
1248	CTATTACAATGGTATGCCCG
1249	AATCATACAAAGTGTGCCGC
1250	CATGATCTAAGAGTGTAGCC
1251	CAAGAAGTAAGATGCGTGCC
1252	CATGTGATAAGATGTGGACC

Seq. Id	3' to 5' sequence
1253	AACTTAGCAAACCTAGCGCC
1254	TCTTCGATATGATAGCGTCG
1255	GACGTTAATTGATGAGACGC
1256	GCGTGAAGTTGTTAGCACAT
1257	GCCGATACATGCTGACGAT
1258	CGCCGATTAAGCTGCGACAT
1259	CGTCATTAAGTTAGCGCAC
1260	CTCCATCTAAGGTGCGATAC
1261	CGCTTATCAAGGTGCGACACC
1262	GATGACTCAATGTGACTCAG
1263	CGCTAGTGACAATTATGTGC
1264	GCTAGGTGACAGTATGCTAT
1265	GCTGTGCTACGACGTTGACA
1266	GCTAGAGTAGACCGATGCCA
1267	GTATATCGAGATCATAGGCG
1268	GTCTTGGACTATACGAGCGC
1269	TACTTGTAGATAGCGAGCGA
1270	GTACTCTGACATGATTGCA
1271	TATACTGACCTTATCGGCAC
1272	TCGTCTTGAGATATGTGGAC
1273	TCATGTTACGGTATGCGAGA
1274	TCATCTGCACGTATCGTCAA
1275	GCGACTGGACAGATTGCATA
1276	CGGGCGCGAAGTATTACAT
1277	GTGTGGGCACGTATTCATA
1278	TCCGGGCACGGTGTCATATA
1279	TGGGCGCTACTGGCTTTAA
1280	TGCGCCGCCAGTCTGTTATA
1281	TGGCCGTTAGAGTCTGCACT
1282	ATGGGCGCAACCCCTGTCATA
1283	CAGCCCTGAAGACTGCGATA
1284	CGCCGCTCAAGGCTATGATA
1285	CGCTCCTGAAGGGTAGTTAA
1286	GGCCCGACAGGTGCTATTAT
1287	GGATAGGCAGATGCACTTAT
1288	GGACAGACGTTGACCAGCTA
1289	GTAGCGACATTGAGTTAGCA
1290	GACTACGAATTGAGCATAACG
1291	CTACACTAATTGCAGCAGCA
1292	CGTACCCGAATGCAGCAGAA
1293	GACGCCTAATGACGCTGAAA
1294	TAGCTTGTACTGCGACTGAC
1295	GATACTCTAATGCCATCGAC
1296	CGGCGTACAATGCCATAGAA
1297	CGGATACGAAGGCTATGCAA
1298	ACGGATCGAAAGGTATAGCC
1299	ACGGCGCGAAAGCGTCATAA
1300	CGTGAGGGAAATACGTCATCA

Seq. Id	3' to 5' sequence
1301	CACAGTGGAAAGACGCATCAC
1302	GAGGTGACATGACGTACATC
1303	GAGTAGCGAATGCTCAGCCA
1304	TATAGCACAGTGTCCAGCAA
1305	CGTATGTCAAGGGCTGATA
1306	CGAGACGCAAGGGATTACA
1307	GAGACGCAATGTGAATTACG
1308	GATCGCACAGGAGCGTATCA
1309	TGCCAGAGCGTATGAGCAA
1310	TGAGGGCGAGCTATCTATCA
1311	TTGTGGCTAGGTATCGCTAC
1312	TGGTTAGCAGGTATGATCCT
1313	CTCACTGCAAGGATGGGACT
1314	TCCTGTAGATCCCTATGCGG
1315	TCGTTGTCAGCATATTGAGC
1316	ATCATGTGAACCTATTGGCC
1317	TACACTGGGACCTATGGCA
1318	TACCTGGGAGCATACTGAC
1319	TAGCCCGCAGCATAGGGTAT
1320	GAGCCTCAATGCTACGGAAG
1321	GATGTTCAATGCTGGCCGAA
1322	GACTTGTGAATATCTGTGCC
1323	GCCGCCGAATTATTGAGCAA
1324	TGGACTGATTGATAGGCAAC
1325	TGGCAGATCGGTGTATTCAA
1326	TATGCGTAATGGGTGTCCA
1327	TTAGGTCGATTGATAGTCGC
1328	TCTGCTTTACTGCGTAGCCA
1329	TTGACGAGTTGCAGTGCTC
1330	CTTGATTAAGTGCTGTACGC
1331	CTCGGATCAAGGCTTACCGT
1332	CCGGGCTCAACGCTTGTAA
1333	TGTCGCCCAGCTCATGTGTT
1334	CTGGACCCACAGCTATGGAT
1335	CACGGGCCAAGAGATATACC
1336	CGCCCGCCAAGTGTATGATA
1337	CGCCAGGCCACATGGATAGAT
1338	GCCCGGATACATGCGATTAG
1339	GCTGGCCTACATCCGTATGA
1340	AGATGGCGAAATCCGTATAG
1341	GCAGGGACATTACGATCACT
1342	AGCAGGTGAAATCGTACTAC
1343	GCAGGTCAATCTCTGTACGA
1344	GCATTGTAAGTCGGTCAAG
1345	GCACCTGGTAATTCAAGCTACG
1346	AGCATCATAACCCAAGCTGG
1347	ACCAAGTCCAAGCATACTCG
1348	ATCATTCAACGCAGTGACC

Seq. Id	3' to 5' sequence
1349	TCAGCCCTATCGCAGGATGT
1350	GTCAGCACAGCCGTGATTA
1351	GAATTACGCACCCAGCTTGA
1352	GAATGCGCCTACCAGCTATA
1353	GAATGGCGACAGCGTACATA
1354	GGATTGCCACGACTCACAAA
1355	GCTCATTGACACTGCGCTAT
1356	GAGCATGGACCACGGCTATA
1357	CAAATGGACAGACAGCCTGC
1358	CACTTGAAGCACAATCACG
1359	GCTGTTGCAGGACGCGATCTA
1360	TACCTGGCATGACGCGATAT
1361	TTCGTGGACTTGCAGGATCTA
1362	TTCCTGCGATAGCGCGTTT
1363	TTGATCTGATAGCGGGTCTC
1364	TTGATCGCATAGCGCTGAC
1365	TTCGAGGCATGTGGATCTCC
1366	TTCAGCGGCTAGGCGATTT
1367	TCCAGCAGATCGGCAGTTT
1368	TTCAGCCGATCTGCCGATAT
1369	TTCTATCGCATGTCAGCCGT
1370	TGTAATGCCTGCCAGCCGTA
1371	TAATTGCCTGCACAACCTGGA
1372	TAATTCCATTGACGGCAGCG
1373	TTATTGCCATAGCGCGACGC
1374	ACAATTCAAAGCCTGACCG
1375	ACAGGCCAAAGCACTAGGT
1376	CGAATGCCAAGGCCAGCTAA
1377	GATGGTTCAATGCCTGGACA
1378	CTGGGCCAAGTTCTGAGACA
1379	CGTGGGCAATACAGTTGAAT
1380	GAGCTGCGAATCGGTATTAA
1381	GACCGGGCGAATCGAGCATAA
1382	GACTTCGCAATCGGCACGTA
1383	GACCGGCCAATCGTGCCTATA
1384	GATCGCTGAATCGTGCCTAA
1385	GATCACTGAATGCGACGTTAA
1386	GATCGTGCATGAGGTTACA
1387	GAGGACTAATTGAGATGCAC
1388	GACCGATAATTGATATGCC
1389	TAGCATTGATCCCATGTCAC
1390	TTCAGCTTATGCCAGTCGCG
1391	TGACGGCCTTGCATATCCGA
1392	GAACGCGCCTTACATCAAGA
1393	GAATACCAGTTACACTCCAG
1394	CAAGAACTGTTACACATCGC
1395	GACGGAGAATGGACTACACGT
1396	TACAGACGCTTGCATAGATC

Seq. Id	3' to 5' sequence
1397	TAACGACCTTAGCGACGGGT
1398	TAACGACGCTTCCCAAGGA
1399	TTACCGCTGTTGAGCCCGTA
1400	TTCCATGTATCGAGCGTCAG
1401	TATACGCCCTTCAGATCGGG
1402	CTAACGCCTATGCAATATCGC
1403	CCAGCTATAAGCATATTGCC
1404	TACAGCATTGTCATGGACTC
1405	TAAGCTATTGGACATTGGGC
1406	TTAGCATCCTGTCATAGGGC
1407	TCTAGCAGCTTCATAGCCA
1408	TCATCACGCTTCCGAGGAT
1409	GCATACATTGGACGAGAGCT
1410	TCTAGCATTAGCATGGTGC
1411	TTATGACTTGATCTGAGGCG
1412	TGTTCGCACTGGCTTAGCTC
1413	GAGTTGAATGCAGATAGCTC
1414	TGCAGGGCTCGCAGATGCTAT
1415	TGGCAGGACTGTAGCTTAAT
1416	TGGGCACTCTCGCCTAGTT
1417	TGAAGCGCCTCGACTAGGTT
1418	TCATCGGCACTGATAGCTCA
1419	TCATCAGGCATGGAGCCAGT
1420	TAATCAGCGTTACGTCCGCA
1421	GAATGTGACCGCAAGTCTGAC
1422	AGATTTGCACAGATAACGCG
1423	GATTACTGACCAAGCAGTCAG
1424	AACTATCGAAACCGCCAGGG
1425	ATAATACAAGAGTCGCGCCG
1426	ATAATCATAACCTCGACGCG
1427	ATTATCATAAAGGCAGGCG
1428	TATATCGGATCAGCAGGTCA
1429	TAATTCGCTACGCAGGGAG
1430	TAATCCTGTTACGCGGGAGGC
1431	CTTAGCTCCACGCAGTGTG
1432	TTCTAGCCGTCCGCAGTTG
1433	GTCATGCGAGCAGCAGTCTT
1434	GGCGTTCGAGCAGTCATCTT
1435	TACCGCCAGTCAGCGAGTTA
1436	TACCGCCTAGCAGCATTGGT
1437	TACCGCACTGCATGTCAGGT
1438	TGTCTCGATGCAGGTCTAGT
1439	GCCGCATGACGAGGATATAC
1440	TACCGCGAGGCAGGATTCTT
1441	TACAGCAGTGCAGGGCCTTA
1442	GCAGCTAGAGCAGAGTATCA
1443	GACAGCAGATCAGAGACTCC
1444	TAAGCACGTTAGAGCTGAC

Seq. Id	3' to 5' sequence
1445	TAACCGTGTGCAGATCGGAT
1446	TACTGCGGACCTGGATCTAC
1447	TCAGGGCTACTCGATTGGAA
1448	TCCGCAGACTTAGCGTTACG
1449	TGAGCAGCCTACGTTACTAG
1450	TGCGTCAGATGCGTATATGC
1451	TCGTCCAGATGCGGAGTTCA
1452	TCGGCTATATGCCAGATCCT
1453	AAGGACAAAGAGCGCGTCTC
1454	TAGCACCGATGGCGAGCTTA
1455	TGTCCACGGTGCCGCAATAT
1456	TGGTCCGACTGCTGCTACTA
1457	TGTGCCGACTGCCGCTTAT
1458	TTCGCAGTATGGATCGGTAT
1459	TTACGCAGTTGCATGGAGCT
1460	TTCTGATTAGCTGCCGACGC
1461	TGGTTATACTTTCGAGAGC
1462	TTTGTAGCTCGGGCAGCC
1463	TTGGTCTGATCCGGGCATAC
1464	TGCTTGGACTCCGGCGATTA
1465	CTGCTTGGACCAGCCAGTTA
1466	AAGCTGGAAACGCACACCT
1467	AAGCGGGCAAACGATATGCT
1468	AAATGCCGAAACCATCTCGT
1469	CCATTCGGAAGCGACTCGAT
1470	TACATGGGCTGAGAACGCAA
1471	TATTTGGGACCGAGCGCCTAT
1472	CATCCGGGAAGAGTAGCACA
1473	ATTCATGCACATAGCACGC
1474	ATTGCAGCACAAGCCAGACT
1475	TTGCTAGGCTCAGTCCCGAT
1476	TTGGCGAGCTGCGTCTCAT
1477	TCCCAGAGATGCGACTGCTA
1478	TTCGCTGGATCGGCATGTCT
1479	TTGCTCCTAGCTCGCGTGAT
1480	TTGCTGCTAGTCCAGTAGGC
1481	CATTAAGCAGTCGAGAGACC
1482	CGTTAATGCAGCGAGAACATCA
1483	CGCAAGCTCAGCAGAATTAC
1484	CCATGTCGAAGCATTCTAC
1485	CTGAATGTAATCATCGTGCC
1486	CTTAGATGAATCACTGCCAC
1487	CTTCACGGAATCTAGGCACA
1488	CACTCTTGAAGCTAAGCACA
1489	CCTCTAAGCATGTTGACACA
1490	CATGCCGGAAGATGCGTACA
1491	CAGGCAGCAAGATGTACGAC
1492	CAGTGGGCAAGATAAGATTG

Seq. Id	3' to 5' sequence
1493	CCGTGCCAAGCTAGTGATA
1494	GATCGGGCAATCTGCGTACT
1495	TTCAGTGCATTATAGTGCAGG
1496	TTATCTGCATGAGTAGGTCG
1497	TCGATAATCTTGTAGCGCG
1498	TCTTACAGCTTGCAGGGAG
1499	TCCTACATTTGCCACGGGAG
1500	TCTTCATCAGTGAGGCGCGA
1501	TTTCTAGGATGTATGCGAGC
1502	TATCCAGCATTACTGCGAGA
1503	TTATTCTCAGCACGACCGA
1504	TGATTCGCACTCGCGCTAA
1505	TTTGTATGAGTCGCTCCGAA
1506	TTCCGATCAGTCGATGCAAA
1507	GATCGTCAATCTGATGCACC
1508	AGATCGCTAATGAGGACCC
1509	GATGCTATAATCGTATGGCC
1510	AGGAGCGTAAATTATCAGCC
1511	GGGCGATGACTATATCTGAA
1512	CTGGATTGACACTAGCATACT
1513	CTGCGGATACCATAGACAAAC
1514	ACTGCAATAACATATCCGCG
1515	AATGACATAAAGTGCCTGCC
1516	ACATGCAGAAAGTAGTCCGC
1517	ACAGGGGAACAAATGTACCCG
1518	ACCAGCACAAAGTCTACTGT
1519	AGAGAGCCAAATGACTGTCC
1520	TAGTGCATAATTGCTTGCCT
1521	TGAGCATATAGTATTGGGC
1522	TGAGCGTTAGAGCTTGATCC
1523	TAGGCGCTAGGACTCGTTAT
1524	TATGGCCGACGATGTGTCAC
1525	TATGGCTGACGTAGCGCACT
1526	TCTCGGTTACTGAGTGGACT
1527	ATAACGGGACAGAAGCTGCT
1528	ATAGAACTCAATAGCCGCTC
1529	CATAATACACATACGCTGCG
1530	CAGTACGCAAGCAGATAGCC
1531	CAGACGCGAAGATAAGTTCC
1532	CAGCCAAGATAGCATACTCG
1533	TCCCATAGATAGCTCGCTGG
1534	TTCGCATGAGTGCTGAGTAC
1535	TTCCATATACTGGTCGGCAG
1536	TTTATGATATGCGTCGCGGA
1537	TTTCTTATATGCGCGAGCGG
1538	TGTTGCATATTAGCGGCTCG
1539	TATATGACATCTCTTGCCTCG
1540	TTGTCACATTGCGCTCCGA

Seq. Id	3' to 5' sequence
1541	GCATCCGAATTGCGACGACT
1542	GGATCTGAATTGCGCGACCA
1543	GGCTATGAATTGCGCATCAC
1544	GGATATGCAATTGTAGCCC
1545	CAGCGTATAAGCAAGATGGAT
1546	CGAGCGATAATCAAGTCGAG
1547	CGCGGATGACACATACTCAG
1548	CGACGAGCACCAATTGAGA
1549	CCGTAGTGACCAATGAGAC
1550	GCGATATACATCATTGGAC
1551	GACAGTCTAATCACTCGTAC
1552	GCAGTTATACTAAGGTGTGC
1553	GCAGTAGTAATGAGTGTAC
1554	GCAATGTAGTCGAAGTGTCT
1555	GCATATAGATACCATTGCG
1556	CGAATACTAGACACATTGCG
1557	CAACTACAGTACACAGCGT
1558	AGACACAGAACTACCGCGT
1559	ATAGCACAACTAGACGCCG
1560	ATACAGTCAACTACATCGC
1561	AGTACAACCTAGAATCCGGC
1562	GAAGACTACTAGATAACGCG
1563	CGATAATACTACAGACTCCG
1564	CCGTGCGTACACATAGATCA
1565	CGTGAGCGACACATGATCCT
1566	CTGTAGTGACATATAGAGCG
1567	ATGTCGTACACAGAACACG
1568	ATGCTACGAACCTACCAATCG
1569	ATGATAACGTACACACCTGC
1570	TCGGTCTACGTCTGCTCAGT
1571	GGCTCACGATCCACTGGTTA
1572	TGCCTGATACCTTGGATGAC
1573	GGCCGTGAATTATCATAGAC
1574	GGCTTGGACGCATTGATAAC
1575	CCCATCGAAGCATGTGTAA
1576	CGGCATCGAAGGCCTTCATA
1577	GCCAGTTGACCACTCTGAG
1578	TCGCATTAGCCATGTGGAGC
1579	GCAATCTAGTCTAATGGCGC
1580	CTAAGATGTTCTAATGGCCC
1581	CCAATAGTAAGTAATGGGCC
1582	TCATTATACTCTGATGGCCC
1583	ATGCTAATAACTGATGGCCC
1584	AGTGTCAACCCTGATGAACC
1585	AGAGCATAACATCATGGCCC
1586	AGAATCTAACAGCGATGGCG
1587	ATTTAGACAAGTCGATGGCC
1588	ATATTAAGAAGTAGGCAGGCC

Seq. Id	3' to 5' sequence
1589	CATATCAGAATACGATGGCC
1590	GATATACAGGATTATGGCGC
1591	CATAAATTGGTTCACACCGC
1592	GAAACTCCAATTCAAGCGGAC
1593	GAACAATGAATTAGCGGCC
1594	TTCCATTAGATGTGATGCC
1595	TATCATATCATCTGAGGCC
1596	ATCAGAAGAACTGCACGTCC
1597	AGCACACAAGAACTACGCGCTG
1598	AGCAAAGAACCATGCCGCGT
1599	TAAAGAGCAATGTGGCGTAC
1600	TTCAAGGGCATTGAGCGTAAA
1601	TTAATGGGCTTGAGCGTATC
1602	TTAATGCCGTTGAGATCGAC
1603	GCAGGGATAGCAGATACATC
1604	TCAGGAGAGGCATCGCATCA
1605	TTATCTTAGGGATGCGGATC
1606	TGTGCTCTAGGTATCCGAG
1607	TTGTATCTAGTGCAGGGCAA
1608	TATTATCTAGTATGCGCGGC
1609	TAGTTATCAGAGTGACTGCG
1610	GTTAGATCATAGTCACCGCG
1611	GTTAGTATAGATTGGCCGAC
1612	GTGTTTATACGTTGAGCACG
1613	TTATCTGTAGTCATCGAGGC
1614	TGATACTGAGTTAGCGAGCT
1615	GTGATCTCAGAGCGCAGCTT
1616	CAGATGTCAAGACGCGGACT
1617	CTGGTCAGACAGCGGAATCT
1618	CGTGGCAGACAGCTAGATAT
1619	GTGCCGAGACTCCACTGTTA
1620	GCAGGACAGCTCTCCTAGTAT
1621	ATGCACAACTATCAAGCCTG
1622	GTGCTTTACTAGCGGAGCCA
1623	TAAATATCGTATAGGCGGCG
1624	TAATTCTACTATACGCGGGC
1625	TAAATCGTATGTAGCAGCGC
1626	TCCTTCACTGTAGGCTAGGC
1627	TCAGTTATATGAGCCGACTC
1628	TCACGTATATTGACTCCGAC
1629	TCACCGTATTGAGGGCGACA
1630	TCGTAUTGATTGACGGTGAT
1631	TCACAGCGGTCGAGGTTACT
1632	TTCACGCGGTCGCACTATCT
1633	TACTTGACGTGACTGCATCG
1634	CGTCACAGAGGACAGCATAAC
1635	TCACTAGAGCGTCGAGCTGT
1636	TCTACAGTGTGTCAGAGTGA

Seq. Id	3' to 5' sequence
1637	CTACCTAATCGACAGCAGAG
1638	CACCGATAACTACAGCAGGG
1639	CAACGTCTAGGACAAGGCAG
1640	CACTAGCTCAGACAGACGAG
1641	GACTTACAGTACGATCGC
1642	GACACTGACTGACATCGAGA
1643	GAGACAGTCGAGCGATCAAT
1644	GCACTTGTACGTCCAGTCAG
1645	GTACACGGACTGCCAGCATA
1646	GTAATACGCTATCAGCAGAC
1647	CTAGATAGACATCACTCAGC
1648	TAGACTCTCGATCAGCCGTA
1649	GACTTGCACGTACAGCCGAA
1650	CTTATGCGACACTAGCTCGA
1651	CTGATGCTACACTAGGCACA
1652	GCAGACGCACTATCATATAC
1653	GCAGTAGACACTTCTCACGA
1654	GCAGGTACACTGACCGACTA
1655	GCACATCACTGCACGATAGA
1656	GCAATGACTTCGACTCCAGA
1657	GACAAGTCATTTACAGGCAGA
1658	GTAACTTGTGACAGTGCG
1659	GACACTGCATGGACAGCGTA
1660	GCAAGGACTGAGACATGCTT
1661	TGCGAGGTAGGTTATATCTC
1662	TGCGGAGAGTGATATACTTC
1663	GGCGTGAGAGCATTATATCT
1664	GTGCTGCGAGAGTATTATCT
1665	CCCGCGTGTACCATATAATAC
1666	GAGCGTGGACGATATAACT
1667	GGCCGTGTACGATTATGACT
1668	GTAGCTTGACGATGCTGACT
1669	GTGCTGGTACTAGCTGCTCT
1670	TAATGTGACGTAGCCGACTC
1671	TACCGAGTGCGAGATGCTCA
1672	TACCGATGTCGATAGATCCA
1673	TCTCGTATAGGATGAGCAAC
1674	TCGTGAGTAGGATGCTTCA
1675	TACGTGAGATGATGATCGCT
1676	TAGTCGGTAGCATGAGTCTA
1677	TAGTCGAGGAGTAGTCATC
1678	TAGGTACAGTGCTGGATACT
1679	CTGCGTCAAGTGTGAGAAT
1680	TGTGCGCTAGAGTCTGTCCT
1681	GGTGCACGATCTCCAT
1682	GTGTGGGTACTATGCCATCA
1683	GCTGATGTACTATCCATACC
1684	GCTAGATGACGATCAGGTAC

Seq. Id	3' to 5' sequence
1685	GCATCTGTACGATCTCAGCA
1686	GCATCACGACGATTATCAGA
1687	GCTACGTTACCATGTGCAGA
1688	GCGTAGTTACCATGCTCACA
1689	GCGTGAGCACACTCTATCAG
1690	GCGTGCAGATTATGTATCAG
1691	TGTGGACACTTCTTATAGGC
1692	GCGTGAGTAATTGACTACG
1693	AGGTGCGTACAAATGCTATG
1694	CGCAGCCGAAGTACGCTATA
1695	CGACTGCTAAGGAGCGTACA
1696	CGATGTTGACAGACCGCACT
1697	CATGTAGAACTGACTCACAC
1698	CGAGCGGTAAGGATCTCACA
1699	ACACGCTGAAAGAGTACGCC
1700	GATCTGACAGGTAGCGATAC
1701	TCTCGTGCAGGTAGCTGTCA
1702	GCTCGGACAGATCGGTATCA
1703	GCCGGTATAGCTCGATATGC
1704	GCTGATACAGTTCGATAGAC
1705	CCTGACTAAGCTCGATAGAG
1706	GCTGATTACGATCTAGTAGC
1707	GAATGCTACGACGAGTAGC
1708	GAACCTGTCCTGACGAATGAG
1709	TTACTGTCTATGCGATCCGA
1710	GTTATGTCATCGCAGATTCC
1711	AGCTATATCAAGCAAGCGTC
1712	GCTTATACAGTGCAGTAGAG
1713	TTAAGTAGGTAGCTGGCCTC
1714	CAAGAGTAAGTCAAGGCC
1715	CACTAAGACATGCACAGCGG
1716	CCTAGTGCAGACCACATGAT
1717	TCATGCACGTCGCCATAGGT
1718	TCTATACGCTCGTGCAAGGA
1719	TCAAGCCCCAGCCGAGTTTA
1720	TCAGCGCCAGCATTGATGGT
1721	CCATGCGGACCAAGTCGATA
1722	GAATGCCGAGCAATGATCCT
1723	GAATCGGCAGCAATACTGTC
1724	GAAGCCCAGCTAAGTGGTAT
1725	AACAGCCCCAACCGGATGGT
1726	TAAGCACCTTGCAGGATAGA
1727	TCAGCCCCGATCCAGGGTATT
1728	TATGCGCCCAGGAGGCTTTA
1729	TGCCCGAGCAGGTGGATTAT
1730	TAGCTCGCATCACTGACGGA
1731	GGTCCCATAACGAGTGGCATA
1732	ACTAACCCAACAGCGGAGGT

Seq. Id	3' to 5' sequence
1733	CAGCTCTAAGCAGCACAGGA
1734	CAGGTCAAGCACATACCACT
1735	CTGTGCAATCACGCCAGAGA
1736	CGGCGCAATAATGTCACAGA
1737	CGGGACATAATTGACACAGT
1738	AGGGCCAGACAATAACACCGT
1739	GAGGTACAATTTGCTACAC
1740	CAGGCACAAGATTGAGCAGC
1741	ACAAGCGCAAATACTGCCGG
1742	ACAATCTGAAATAGCGCGGC
1743	ATCGACCCAGAAATAGCTCG
1744	ATAAGCACAAGCAGCGCGGT
1745	AACACTCCAAACCGAGGGTG
1746	AATCTATCAAAGCGACGGCC
1747	ATTCCCATAACGCGGAGGAC
1748	ATGCCAGCAACGCGCTAGAA
1749	ATGCTCACAAGCCACGAGAG
1750	ATGCTCCAACGATACTACG
1751	CAGCTTCAAGAGTACATACG
1752	CATGTCACAAGGGCATAGAC
1753	CATGGTCTAAGCCCTACAGA
1754	ACATGGCGAAAGCACACGT
1755	CTTAGTTCAATGCACGCACG
1756	CGCCAGTTAATGCACGACAG
1757	CAGCAGCAACTCGACTAGAG
1758	CCGAAGTCAACTGCGCTAGA
1759	CCAGTGTCAATAAGAGACGT
1760	CCAGGCGAACTGATCGTAAA
1761	CCTGGTACAATCAGTAGCAA
1762	CTAGTGGCAATCATCAGACA
1763	CAATGCGAACTCACTAGACG
1764	CATGGCGTACCAATACTCTAG
1765	AAGTGGCCCAAATAACTGCC
1766	CAAGGCCAATACACAGGGT
1767	GATCTGCCAATGCCCGATA
1768	GATTGCCAATGTGCGCTAA
1769	GAGCCGCCAATGTCAGTAGA
1770	GCGCCCAGGAATGTCGTATAT
1771	GCCGCGCCAATGTTACGTTA
1772	CTTCGCCCCATGCGTAGGAA
1773	TTCCCATGATCGCTGACGAG
1774	TTGCGGGAGCTGCCCTTAA
1775	TTTCCCGGATAGCCGCTGTA
1776	TTTGCTGGAGTATGCGCTCA
1777	TTGTTCTCAGCTTGCAGGAG
1778	TGTGTGGCAGCTTAGTCAC
1779	TCTTGGGTAGCATCTGTCAC
1780	TGGGTGTCAGCATCTACGCA

Seq. Id	3' to 5' sequence
1781	TTGTGGCAGGTATGCTCCAA
1782	GTTGGGCACGGATCTCTATA
1783	GCCGAGGCACCATGCTTATA
1784	CGCTTGGGACAATCGCGTAT
1785	CCGCAGGAACTTCAGCATA
1786	TGGAGGGCAGTCTCTCATAA
1787	CTGGGTGCAAGTTGTATCAA
1788	TGGCGCACATGGTGTATCAA
1789	TGGCATCACTGCTGCCAAT
1790	TGCCAGTCATCCTAGCGTGT
1791	TCAGGCCAGGACTGCTTATC
1792	TTGGCATAGGAGTGCTTCTA
1793	TTTGCAGACGGGTGTGCTATA
1794	TTGAGTCAGGGTGCCAAGT
1795	TTTAATATCGTTGCCGAGC
1796	TCAGGATGATGAGCATGTAC
1797	CTCAAGCTGGGAGAACAGTA
1798	TCAGAAGTGGCTGGATCATA
1799	TCTCACATGGCTGGAGCATT
1800	CTACTGACACTGACCAGGGA
1801	TCGTAGCGACTCTCCAGGTT
1802	TACGTGTCACTATCGTCGAG
1803	TATAGTTACGTCTCGCACGC
1804	TACCGTTACGTCGCTCAGAG
1805	CACTACAACGTGCTACAGAG
1806	ATAGGTATAACGCAGTACGC
1807	ATAGCAGTAACGCATACTCC
1808	ATAATCGTAACGCACCGACG
1809	ATGAGTGTAAACGCCTCGACA
1810	ATGTAGCGAACGTACTCACA
1811	ATCTAGCGAACGGAACATATC
1812	GTAGAGTCACGATGCACTAC
1813	GTAGTATGACGTAGCAGTAC
1814	GTACGTCGAGCTAGATCGCT
1815	GAGTCTGTACGAGGTATCAT
1816	CGTGTCTTACAGCACTACAT
1817	CGTGCCTACAGCAGTCATT
1818	GTAGCCTAGACGCAGTCGTA
1819	CGTCTCGCAAGTCGCGTATA
1820	AGTCGCGCACAGCAACGTAT
1821	ATCGAGGTAACGCCATATAC
1822	CTCGTGACATAGCCATAGAT
1823	ATGCGACGAACGCGGATATA
1824	CTAGACAGACTGCGACATAC
1825	TAGTCGTAGAGGCAGCTATCA
1826	CTATCGAAGTCGCGTGAAC
1827	CTGCGTATAGAGATCAATCC
1828	CCGCGTATAGACAGATATGA

Seq. Id	3' to 5' sequence
1829	CTCGCTTACGACAGACTGGA
1830	CGCGCACGAGACATAGCTTA
1831	AGCGTCACACACAAGACTGG
1832	CCTACGAGACACATGACAGG
1833	CGCCGAGTACACATGCAGAT
1834	CCGTCGATAACAGACTCAGAT
1835	CTCGTCAGACAGAGCGGATT
1836	GTCTCGCCACGTATCGGATT
1837	TCTCGCGTACTTAGGCATCA
1838	GTCTCGGTACGTAGCTAGCAA
1839	CGTGTGAGACAGTAGCATAT
1840	CGTGTAGCACAGCGACGATT
1841	GTGTAGCTCAGTCAGCATCA
1842	AGGTAGATAACGCTAGATCC
1843	CTGTAGAGACATCTGAATCC
1844	CTGATACGAAGTCTTATGCC
1845	CACGCTCGAAGACTAATGAC
1846	CACCGCGATAAGACGTATAGC
1847	CTAGCAGTAAGTCTATGCAC
1848	CGTAGTTGAAGTCATCGACA
1849	CGCGATAGAAGTCAGGACAT
1850	GACGGACGACATCTGAGCAT
1851	CATAGACGAATAACAGCGGGC
1852	GATCACGACCTACTAGCAGG
1853	AGATATAACGAACTCTCGCG
1854	GATTATAGACTACTGAGGCC
1855	GAGTTTATACTACAGTGCCG
1856	GTCACTTACGCTCAGGCAGA
1857	TCGCTAGACGCTCTGGCATA
1858	GTACGCTCAGCACTGGCATT
1859	GACCGCGCTAAACTGTCACA
1860	GCGTGCATACGACTGCCATA
1861	TGTAGTCTAGTGCATGGTCA
1862	GTATAGTCAGAGCTGGCACC
1863	CGTCAGTCAAGTATGGCACA
1864	ACGAGAGTAAATATGCTGCC
1865	ATAGAGCGAACGATAGTTGC
1866	ATCTGACTAACGATGATGCC
1867	GTTGTAGGACGTATGATCTC
1868	TTAGTCGAGTCTATGAGCCC
1869	CGACGATACAGTAATCTAGC
1870	CTGATACAGGCATAGACATC
1871	GGTATCAGAGCTAGGACTAT
1872	TCTATCTCAGCTACGGTCGA
1873	TCAGTTCGATCTACGGCTAG
1874	TCAGTGCAGACTCAGGTACGA
1875	GTCACTGCACTCACGGTAGA
1876	TAACGAGTCTTCAGCACGTA

Seq. Id	3' to 5' sequence
1877	GAAGTCGCCTACATAGCCTA
1878	GAAGTCCGTTACATGACCAT
1879	GTCAGAGGATCGAGCCACTT
1880	GCGAGACAGGTCAGTACAAT
1881	CGTCAGAAGGCTCGCACATA
1882	GCATACAGGTTACGACGCCT
1883	GCGATACAGGTTAGAGATA
1884	GGACGCATAGCTCGCAGTAT
1885	GGACGCAGATCGCAGCATAT
1886	CGCGTAAATCGCAGAGAAC
1887	CGCGTTCTAAGGCACGGATA
1888	CGCGTCGCAAGGCTGTTATA
1889	CGATACGCAAGGCTACGACA
1890	CATCTAAGGACACTACACTG
1891	TATCATCGAGGACTCAGTGC
1892	CACCGAGCAAGACTGACATG
1893	CGCACCCGAAGTCAGAGATA
1894	CGGCTAGGAAGTCAGCATAA
1895	ATGCTGCGAACGCGCCATAA
1896	CCCGGTGCAACGTGTTCTATA
1897	GTCGCTGCATAGCATCTCAG
1898	GTCTGTGCATAGAGCGTCAT
1899	GTGGTGTCACTGATACGTCA
1900	GGTTAGCACTAGATCGCACT
1901	CGGGATCTACAGCATCATAG
1902	CTGGATATACAGCACTCACA
1903	ATGCGGCTAACGCCCTATAA
1904	TCGCGGCGCACTCTGTTATA
1905	TCGTGCTACTGCCACTGTAT
1906	TAGGACACTTCGCCACTATG
1907	TATGACAGTTCGCGCTACCG
1908	TCGCGCAGTTAGCCCTATGT
1909	TAGCCACCGTAGCTGATCGT
1910	GTAACCCGCTATCAGATCGA
1911	AGAGCGAACACCACATTGT
1912	AGGCTAAGAACGCACACTCG
1913	GAGCCTAGACAGCTTCATAC
1914	GGCAGTTACGACTCGACAT
1915	GGCCTTAGACGACTCGCATA
1916	GGTCGATCAGCACTGCATAC
1917	GGAGAGTCAGCACAGTCCTA
1918	GTATAGGCAGCACGGCTCAT
1919	GCACGGCGAGCACTATCTTA
1920	TAACGTCTGCACGATCTGT
1921	GGACGCCTAGCACATCTGAT
1922	CGCTGCACATCACATGGATT
1923	GCACATCGAGCACATGCACT
1924	GCACGACCAGCTTCTAGGAT

Seq. Id	3' to 5' sequence
1925	CCCACCAGACAGATAGAGGT
1926	CCCGACGCAAGAATAGATAG
1927	CCCACGACAGATACTGAGT
1928	CTTCGCGCAGCTACATAGAT
1929	CGCTCCGAAGCTGCGATAAT
1930	CGCCGCGTAAGCAACAAATT
1931	CGACGCTCAAGGACTCATAA
1932	CGCACACTAAGGATCATTAC
1933	AGACACGCAAGAAGCTGGCT
1934	GCACGCATAGCAGAGGATCT
1935	GCTACGTCACTGAGCAGGAT
1936	GTACATCTCGTGAGCAGAGC
1937	CTACACGACTTGAGACGAAG
1938	CTAAGTACGTGCAAGCAAGG
1939	GACACGTAGGACAGCTATGC
1940	GACATAGTAGACATCTCACG
1941	GACAGCGTAGACATCGTCAG
1942	GACTATCACGACATTAGCG
1943	GATCTACACGCTACCAGTGG
1944	GCTTACTACGGATAGATCAG
1945	GCGTATCTAATGGAGTAGCA
1946	GCGTATTTACAGTGAGCGAC
1947	GCGTATATCGAATTGAGTGC
1948	GCGTTCACAGAGTCCACGAT
1949	CGCGTATCAAGGTACAGACA
1950	GCTATTACAGTGTCAAGAGAC
1951	CGTCAGATAAGGTGAGTTAC
1952	CGTCTGTGAAGGTCACTAA
1953	TATTAGCACTCGTCAGCAGC
1954	ATGTTATCAACGTCAGCGAC
1955	GGCATACTAGAGTCAGCGAT
1956	AGTGCAGATAACATACGAGCG
1957	CAGCACACAGAGTACAGCGT
1958	CGTAGCATAAGGTACAGCACC
1959	GTCCATAGACGTTGATACCA
1960	GCTACGATAAGATGAGCCACG
1961	CGGAGTACACCAAGATCCAGA
1962	GAGCGTATAGGAGATCCAAC
1963	GACTGTAGAGAGACGATCCA
1964	CTAGTAGGAAGTGCAGATCAA
1965	CGTAGAGGAAGTGTACTCA
1966	CGTATCGGAAGTGTAGTATCA
1967	CTATGACGAAGTGAGAGTAC
1968	GTTCGTAGAGATGATCGTCA
1969	GTTCTCAGATAGTATGCAGC
1970	AGTCTGTTAAGATATGCGCC
1971	AGCACGGAACAGTAAGCCCT
1972	ATCCAGAGAACGTGAGATCC

Seq. Id	3' to 5' sequence
1973	GACAGTGTAAATATGAGGACC
1974	CATAGTAGAAGATTGAGGCC
1975	TGAGATATAGTATGCCGCCA
1976	ATGAACATACTATACCGCGC
1977	TTCTCTATATCGCGCGGA
1978	TGAGTTTACGTGTATGGCAC
1979	ACGGCATCAAAGTTGCATAC
1980	ACGGGCTCAAAGTATGATAG
1981	AGGCGCTTAAATGTGGATAC
1982	CTGCCGTTAATGGCGGACAT
1983	CTGAGCCAATAGGCGCACTT
1984	TAGGCATGATGAGAGCTATC
1985	TGCCTATGAGGAGTATGAAC
1986	GGGCTATAATGAGCTTGACT
1987	TAGGCTTCATCAGCTATCAG
1988	ATTGCTTCAACGGGCATTAC
1989	TATGATCCATGCGACTCGGA
1990	TTGTATCCATCGGCCAGTG
1991	ATCAAGGCAACCGCCAGTAG
1992	TCTCAGCCATCCGTGATAGG
1993	TATCAGGCATCCGAGCATAG
1994	TTAAGCTCCTCAGTCCATGT
1995	TAAGGGCGATGAGCCTATCT
1996	TAAGGCCGAGGAGCTTCAT
1997	TAAGGCAGTGGAGCCCTCTA
1998	TGGACAGGCTGCGCTCTATA
1999	CTGGAAGCCTGCGACCAAAT
2000	TCAATGCACTGAGCCCGAGA
2001	GATTCACACTGACCCATGTA
2002	TAATAGATTGGAGACGCGC
2003	GCATTAGAAGGTCTGGACTA
2004	ATTGGCATAACGTATTGCGC
2005	CAGGACTGAAGATCGAGTAC
2006	TAGAGTCAGTCATAGCTGA
2007	TTTATCGTAGCTGGCTGCC
2008	AGGATTAGAACCTACGCACC
2009	GCCGTGAGACCACTGTACTA
2010	GACGCTGAATCCTATTGACA
2011	CGCCTAAGGATCGTGAAGTA
2012	CGACGACGAAGCTGCATGAA
2013	ACTCGAATAACAGCATCTCG
2014	CCCGTAAGCATGGCACAGAT
2015	CAATACAAGATTACGGCCTC
2016	GATCAGAATCTATGGTACGC
2017	TCTGTGTACTGCTGCCAAT
2018	ATATTTGGAACGCAGCTCAC
2019	TGCAGTATCGCAGCGGTTCTA
2020	GGGCAATGTTATCCACAGA
2021	CTGACCGAATCCAGCAGAGA

Seq. Id	3' to 5' sequence
2022	GATCGTGAATCCGCGCACTA
2023	GAGCCGTAATCCGAGCGATA
2024	TACTCCTGACGACTTAGGCA
2025	TGCTGTCACTCGCGTCTAT
2026	GTACTAGCATATCATCGACG
2027	TATCGCATAGATCAGTGAGC
2028	TACGGGCAGCCAGGTACTTT
2029	GTTCATCACGAGTGCCTAGA
2030	CATGTATCAAGATGGCTGAC
2031	GGTCGCGCATTCCAGCATA
2032	GCACATATCTAGCGACATCT
2033	ACGGGGCTAAAGGTAGATAC
2034	CACTGCCCAACAAGATGTAGA
2035	GGATTACATGGCCTAGCAA
2036	CATGACACAGAAATCGACCGT
2037	AGAGGCATAAAATGAGTCTCC
2038	TGAGTAGTACGTTACGCCTG
2039	CGATAGCGAAGGAGTCCACA
2040	ACACTCTGAAAGACGCGACG
2041	GTCTTAATGTTGGGCAACG
2042	GTTATCGACTACGCTGTACT
2043	TCGTGAGACCGTCGTCAGTA
2044	GACAGCGCAGTACAGGTAAT
2045	CGTACAGTAAGTATGATGCC
2046	TAGAGCATCTGACGCTATGA
2047	GTCACGATTAGTAGGCACG
2048	TCGTACCTGTATTCAGCGCG
2049	TTAATCCGCTGTAGCCAAA
2050	TTAATTGACTTCGCTCCAGC

## EXPERIMENTS

Arrays containing probes corresponding to SEQ ID NOS 1-2050 were designed and manufactured using known photolithography techniques. Four probes were designed to interrogate each sequence from SEQ ID NOS 1-2050: a probe designed to be the perfect match complement to the sequence (PM), a probe designed to have a central mismatch at position 10 (MM), and probes designed to be the complements to the PM and MM probes (cPM and cMM respectively).

FIG. 2 shows an example of the sequences attached to each of the four array features representing a given tag sequence. The first block contains the cPM probe. The second block contains the cMM probe. The third block contains the PM probe - the probe to which the tag is expected to hybridize with the highest affinity. The fourth block contains the MM probe.

FIG. 3 shows the array features from the above-described array. The array was hybridized with biotin-labeled oligonucleotide tags, stained with streptavidin-phycoerythrin, and the data was collected with a laser scanner. Four features, organized vertically on the probe array, represent each tag-probe. For each of the four tag-probes shown, arranged horizontally across the array, the brightest hybridization signal is seen with the “PM” feature.

FIG. 4 is a scanned image of the hybridization pattern resulting from the hybridization of 2050 different oligonucleotide tags labeled with phycoerythrin to an array designed as described above.

FIG. 5 is a scanned image of the hybridization pattern resulting from the hybridization of 50 sequences complementary to SEQ ID Nos. 2001-2050 to an array designed as described above.

FIG. 6 shows signal intensities from two different independent experiments in which 2000 biotinylated oligonucleotide tags or 50 fluorescein labeled control oligonucleotides were hybridized to arrays designed as described above. The frequency of results are shown as normalized (to scale of 0-1, in bins of 0.05) natural logarithms of the net signal intensities. The normalized natural logarithm of the signal intensities obtained are distributed about a geometric mean of 0.8 with a standard deviation of less than 0.1.

FIG. 7 shows the PM/MM ratios from the data described in FIG. 4 above. More than 98% of the hybridization's yielded a PM/MM ratio greater than 3/1.

## **CONCLUSION**

The above descriptions are illustrative and not restrictive. Many variations of the invention will become apparent to those of skill in the art upon review of this disclosure. The scope of the invention should, therefore, be determined not with reference to the above description, but instead should be determined with reference to the appended claims along with their full scope of equivalents.